What Do Workplace Wellness Programs Do? Evidence from the Illinois Workplace Wellness Study*

Damon Jones
University of Chicago
and NBER

David Molitor
University of Illinois
and NBER

Julian Reif
University of Illinois
and NBER

July 2019

Abstract

Workplace wellness programs cover over 50 million U.S. workers and are intended to reduce medical spending, increase productivity, and improve well-being. Yet, limited evidence exists to support these claims. We designed and implemented a comprehensive workplace wellness program for a large employer and randomly assigned program eligibility and financial incentives at the individual level for nearly 5,000 employees. We find strong patterns of selection: during the year prior to the intervention, program participants had lower medical expenditures and healthier behaviors than non-participants. The program persistently increased health screening rates, but we do not find significant causal effects of treatment on total medical expenditures, other health behaviors, employee productivity, or self-reported health status after more than two years. Our 95 percent confidence intervals rule out 84 percent of previous estimates on medical spending and absenteeism.

JEL Classification: I1, M5, J3

Keywords: Health care, workplace wellness, selection, productivity, field experiments

*This research was supported by the National Institute on Aging of the National Institutes of Health under award number R01AG050701; the National Science Foundation under Grant No. 1730546; the Abdul Latif Jameel Poverty Action Lab (J-PAL) North America U.S. Health Care Delivery Initiative; Evidence for Action (E4A), a program of the Robert Wood Johnson Foundation; and the W.E. Upjohn Institute for Employment Research. This study was pre-registered with the American Economics Association RCT Registry (AEARCTR-0001368) and was approved by the Institutional Review Boards of the National Bureau of Economic Research, University of Illinois at Urbana-Champaign, and University of Chicago. We are grateful to Andy de Barros for thoroughly replicating our analysis and to J-PAL for coordinating this replication effort. We thank our co-investigator Laura Payne for her vital contributions to the study, Lauren Geary for outstanding project management, Michele Guerra for excellent programmatic support, and Illinois Human Resources for invaluable institutional support. We are also thankful for comments from Kate Baicker, Jay Bhattacharya, Tatyana Deryugina, Joseph Doyle, Amy Finkelstein, Eliza Forsythe, Drew Hanks, Bob Kaestner, David Meltzer, Michael Richards, Justin Sydnor, Richard Thaler, and numerous seminar participants. The findings and conclusions expressed are solely those of the authors and do not represent the views of the National Institutes of Health, any of our funders, or the University of Illinois. Email: damonjones@uchicago.edu, dmolitor@illinois.edu, and jreif@illinois.edu.

1 Introduction

Sustained growth in medical spending has prompted policymakers, insurers, and employers to search for ways to reduce health care costs. One widely touted solution is to increase the use of "wellness programs," interventions designed to encourage preventive care and discourage unhealthy behaviors such as inactivity or smoking. The 2010 Affordable Care Act (ACA) encourages firms to adopt wellness programs by permitting them to offer participation incentives up to 30 percent of the total cost of health insurance coverage, and 18 states currently include some form of wellness incentives as a part of their Medicaid program (Saunders et al., 2018). Workplace wellness industry revenue has more than tripled in size to $8 billion since 2010, and wellness programs now cover over 50 million U.S. workers (Mattke, Schnyer and Van Busum, 2012; The Kaiser Family Foundation and Health Research and Educational Trust, 2016*b*). A meta-analysis by Baicker, Cutler and Song (2010) finds large medical and absenteeism cost savings, but other studies find only limited benefits (e.g., Gowrisankaran et al., 2013; Baxter et al., 2014). Most of the prior evidence has relied on voluntary firm and employee participation in workplace wellness, limiting the ability to infer causal relationships.

Moreover, the prior literature has generally overlooked important questions regarding selection into wellness programs. If there are strong patterns of selection, the increasing use of large financial incentives now permitted by the ACA may redistribute resources across employees in a manner that runs counter to the intentions of policymakers.[1] For example, wellness incentives may shift costs onto unhealthy or lower-income employees if these groups are less likely to participate in wellness programs. Furthermore, wellness programs may act as a screening device by encouraging employees who benefit most from these programs to join or remain at the firm—perhaps by earning rewards for behaviors they already enjoy.

This paper investigates two research questions. First, which types of employees select into

[1] Kaiser (2017) estimates that 13 percent of large firms (at least 200 employees) offer incentives that exceed $500 dollars per year, and 4 percent of large firms offer incentives that exceed $1,000 per year.

wellness programs? While healthy employees may have low participation costs, employees in poor health may have the most to gain from participating in these programs. Second, what are the causal effects of workplace wellness programs on medical spending, employee productivity, health behaviors, and well-being? These effects could be negative or positive. For example, medical spending could decrease if wellness programs improve health, or increase if wellness programs and primary care are complements.

To improve our understanding of workplace wellness programs, we designed and implemented the Illinois Workplace Wellness Study, a randomized controlled trial (RCT) conducted at the University of Illinois at Urbana-Champaign (UIUC).[2] We developed a comprehensive workplace wellness program that included an on-site biometric health screening, an online health risk assessment, and a wide variety of wellness activities (e.g., smoking cessation, stress management, and recreational classes). We invited 12,459 benefits-eligible university employees to participate in our study. We successfully recruited 4,834 participants, 3,300 of whom were assigned to the treatment group and invited to take paid time off to participate in the wellness program.[3] Those who successfully completed the entire two-year program earned rewards ranging from $50 to $650, with the amounts randomly assigned and communicated at the start of each program year. The remaining 1,534 subjects were assigned to a control group, which was not permitted to participate. Our analysis combines individual-level data from online surveys, university employment records, health insurance claims, campus gym visit records, and running event records. These data allow us to examine many novel outcomes in addition to the usual ones studied by the prior literature (medical spending and employee absenteeism).

Fifty-six percent of employees in our treatment group completed the initial major component of our intervention, which included an on-campus health screening. We find evidence

[2]Supplemental materials, datasets, and additional publications from this project will be made available on the study website at http://www.nber.org/workplacewellness.

[3]UIUC administration provided access to university data and guidance to ensure our study conformed with university regulations, but did not otherwise influence the design of our intervention. Each component of the intervention, including the financial incentives paid to employees, was externally funded.

of significant advantageous selection into our program based on medical spending and health behaviors. At baseline, average annual medical spending among participants was $1,384 less than among non-participants. This estimate is statistically ($p = 0.027$) and economically significant: all else equal, it implies that increasing the share of participating (low-spending) workers employed at the university by 4.3 percentage points or more would offset the entire costs of our intervention. Participants were also more likely to have visited campus recreational facilities and to have participated in running events prior to our study. We find evidence of adverse selection when examining productivity: at baseline, participants were more likely to have taken sick leave and less likely to have worked over 50 hours per week than non-participants.

Despite strong program participation, we do not find significant effects of our intervention on 40 out of the 42 outcomes we examine in the first year following random assignment.[4] These 40 outcomes include all our measures of medical spending, productivity, health behaviors, and self-reported health. We fail to find significant treatment effects on average medical spending, on different quantiles of the spending distribution, or on any major subcategory of medical utilization (pharmaceutical drugs, office, or hospital). We find no effects on productivity, whether measured using administrative variables (sick leave, salary, promotion), survey variables (hours worked, job satisfaction, job search), or an index that combines all available measures. We also do not find effects on visits to campus gym facilities or participation in a popular annual community running event, two health behaviors that a motivated employee might change over the course of one year. These null effects persist when we estimate longer-run effects of the entire two-year intervention using outcomes measured up to 30 months after the initial randomization.

Our null estimates are meaningfully precise. For medical spending and absenteeism, two key outcomes of interest in the prior literature, the 95 percent confidence intervals of our estimates rule out 84 percent of the effects reported in 112 prior studies. The 99

[4]Participants were assigned to treatment and control groups in August 2016. Health screenings occurred in August and September, and wellness activities ran from October 2016 to April 2017.

percent confidence intervals for the return on investment (ROI) of our intervention rule out the widely cited medical spending and absenteeism ROI's reported in the meta-analysis of Baicker, Cutler and Song (2010). In addition, we show that our OLS (non-RCT) medical spending estimate, which compares participants to non-participants rather than treatment to control, agrees with estimates from prior observational studies, but is ruled out by the 99 percent confidence interval of our IV (RCT) estimate. These contrasting results demonstrate the value of employing an RCT design in this literature.

Our intervention had two positive treatment effects in the first year, both based on responses to follow-up surveys.[5] First, employees in the treatment group were more likely than employees in the control group to report ever receiving a health screening. This indicates that the health screening component of our program did not merely crowd out health screenings that otherwise would have occurred in the absence of our intervention. Second, treatment group employees were more likely to report that management places a high priority on worker health and safety, although this effect disappears after the first year.

Wellness programs may act as a profitable screening device if they allow firms to preferentially recruit or retain employees with attractive characteristics such as low health care costs. Prior studies have shown compensation packages can be used in this way (Lazear, 2000; Liu et al., 2017), providing an additional economic justification for the prevalent and growing use of non-wage employment benefits (Oyer, 2008). We do find that participation is correlated with pre-existing healthy behaviors and low medical spending. However, our estimated retention effects are null after 30 months, which limits the potential of wellness programs to operate as a profitable screening mechanism in our setting.

Our results speak to the distributional consequences of workplace wellness. For example, when incentives are linked to pooled expenses such as health insurance premiums, wellness programs may effectively increase insurance premiums for low-income workers in poor health (Volpp et al., 2011; Horwitz, Kelly and DiNardo, 2013; McIntyre et al., 2017). The results

[5]We address the multiple inference concern that arises when testing many hypotheses by controlling for the family-wise error rate. We discuss our approach in greater detail in Section 3.3.

of our selection analysis provide support for these concerns: non-participating employees are more likely to be in the bottom quartile of the salary distribution, are less likely to engage in healthy behaviors, and have higher medical expenditures.

We also contribute to the health literature evaluating the causal effects of workplace wellness programs. Most prior studies of wellness programs rely on observational comparisons between participants and non-participants (see Pelletier, 2011, and Chapman, 2012, for reviews). Publication bias could also skew the set of existing results (Baicker, Cutler and Song, 2010; Abraham and White, 2017). To that end, our intervention, empirical specifications, and outcome variables were pre-specified and publicly archived.[6] Our analyses were also independently replicated by a Jameel Poverty Action Lab (J-PAL) North America researcher. A number of RCTs have focused on components of workplace wellness, such as wellness activities (Volpp et al., 2008; Charness and Gneezy, 2009; Royer, Stehr and Sydnor, 2015; Handel and Kolstad, 2017) or health risk assessments (Haisley et al., 2012), or on particular outcomes such as obesity or health status (Meenan et al., 2010; Terry et al., 2011). By contrast, our setting features a comprehensive wellness program, which includes a biometric screening, health risk assessment, wellness activities, and financial incentives.

Our study complements the contemporaneous study by Song and Baicker (2019) of a comprehensive wellness program. Similar to us, Song and Baicker (2019) do not find effects on medical spending or employment outcomes after 18 months. Relative to Song and Baicker (2019), our study emphasizes selection into participation, explores in detail the differences between RCT and observational estimates, and includes a longer post-period (30 months). In contrast to our study, which randomizes at the individual level, Song and Baicker (2019) randomize at the worksite level to capture potential site-level effects, such as spillovers between coworkers. The similarity in results between the two studies—and their divergence from prior studies—underscores the value of RCT evidence within this literature. In addition,

[6]Our pre-analysis plan is available at http://www.socialscienceregistry.org/trials/1368. We indicate in the paper the few instances in which we deviate from our pre-analysis plan. A small number of pre-specified analyses have been omitted from the main text for the sake of brevity and because their results are not informative. For completeness, we will report those omitted results in a separate appendix.

our finding that observational estimates are biased toward finding positive health impacts—even after extensive covariate adjustment—reinforces the general concerns about selection bias in observational health studies raised by (Oster, 2019).

The rest of the paper proceeds as follows. Section 2 provides a background on workplace wellness, a description of our experimental design, and a summary of our datasets. Section 3 outlines our empirical methods, while Section 4 presents the results of our first-year analysis. Section 5 presents results from our longer-run analysis, and Section 6 concludes.

2 Experimental Design

2.1 Background

Workplace wellness programs are employer-provided efforts to "enhance awareness, change behavior, and create environments that support good health practices" (Aldana, 2001, p. 297). For the purposes of this study, "wellness programs" encompass three major types of interventions: (1) biometric screenings, which provide clinical measures of health; (2) health risk assessments (HRA), which assess lifestyle health habits; and (3) wellness activities, which promote a healthy lifestyle by encouraging behaviors such as smoking cessation, stress management, or fitness. Best practice guides advise employers to let employees take paid time off to participate in wellness programs, and to combine wellness program components to maximize their effectiveness (Ryde et al., 2013). In particular, it is recommended that information from a biometric screening and HRA inform the selection of wellness activities (Soler et al., 2010).

Wellness programs vary considerably across employers. Among firms with 200 or more employees, the share offering a biometric screening, HRA, or wellness activities in 2016 was 53 percent, 59 percent, and 83 percent, respectively (Kaiser, 2016a). These benefits are often coupled with financial incentives for participation, such as cash compensation or discounted health insurance premiums. A 2015 survey estimates an average cost of $693 per employee

for these programs (Jaspen, 2015) and a recent industry analysis estimates annual revenues of $8 billion (Kaiser, 2016b).

A number of factors may explain the increasing popularity of workplace wellness programs. First, some employers believe that these programs reduce medical spending and increase productivity. For example, Safeway famously attributed its low medical spending to its wellness program (Burd, 2009) (although this evidence was subsequently disputed (Reynolds, 2010)), and recent work suggests wellness programs may increase productivity (Gubler, Larkin and Pierce, 2017). Second, if employees have a high private value of wellness-related benefits, then labor market competition may drive employers to offer wellness programs in order to attract and retain workers. Third, the Affordable Care Act (ACA) has relaxed constraints on the maximum size of financial incentives offered by employers. Prior to the ACA, health-contingent incentives could not exceed 20 percent of the cost of employee health coverage. The ACA increased that general limit to 30 percent, and raised it to 50 percent for tobacco cessation programs (Cawley, 2014). The average premium for a family insurance plan in 2017 was $18,764 (Kaiser, 2017), which means that many employers are permitted to offer wellness rewards or penalties in excess of $5,000.

Like other large employers, many universities also have workplace wellness programs. Of the nearly 600 universities and liberal arts colleges ranked by *U.S. News & World Report*, over two-thirds offer an employee wellness program.[7] Prior to our intervention, UIUC's campus wellness services were run by the University of Illinois Wellness Center, which has one staff member. The Wellness Center coordinates smoking cessation resources for employees and provides a limited number of wellness activities, many of which are not free. Importantly for our study, the campus did not offer any health screenings or HRAs and did not provide monetary incentives to employees in exchange for participating in wellness activities. Therefore, our intervention effectively represents the introduction of all major components of a wellness program at this worksite.

[7]Source: authors' tabulation of data collected from universities and colleges via website search and phone inquiry.

2.2 The Illinois Workplace Wellness Study and iThrive

The Illinois Workplace Wellness Study is a large-scale randomized controlled trial designed to investigate the effects of workplace wellness programs on employee medical spending, productivity, and well-being. As part of the study, we worked with the director of Campus Wellbeing Services to design and introduce a comprehensive wellness program named "iThrive" at the University of Illinois at Urbana-Champaign. Our goal was to create a representative program that includes all the key components recommended by wellness experts: a biometric screening, a health risk assessment, a variety of wellness activities, monetary incentives, and paid time off. We summarize the program here and provide full details in Appendix D.

Figure 1 illustrates the experimental design of the first year of our study. In July 2016 we invited 12,459 benefits-eligible university employees to enroll in our study by completing a 15-minute online survey designed to measure baseline health and wellness.[8] Dependents were not eligible to participate. The invitations were sent by postcard and email. Employees were offered a $30 Amazon.com gift card to complete the survey, as well as a chance "to participate in a second part of the research study." Over the course of three weeks, 4,834 employees completed this baseline survey. Study participants, whom we define as anybody completing the 15-minute baseline survey, were then randomly assigned to either the control group (N=1,534) or the treatment group (N=3,300). Members of the control group were notified that they may be contacted for follow-up surveys in the future, and further contact with this group was thereafter minimized. Members of the treatment group were offered the opportunity to participate in iThrive.

The first step of iThrive included a biometric health screening and an online HRA. For a period of 5 weeks in August and September 2016, participants had an opportunity to schedule a screening at one of many locations on campus. They had to make an appointment in advance and fast for 12 hours prior to the screening, where a clinician measured their height,

[8] Participation required providing informed consent and completing the online survey.

weight, waist circumference, and blood pressure. The clinician also performed a fingerstick test to measure blood cholesterol, triglycerides, and glucose levels. Finally, participants met with a health coach, who explained their health measurements to them. The entire screening process lasted about 20 minutes. A few days later, participants received an email invitation to complete an online HRA designed to assess their lifestyle habits. Upon completion of the HRA, participants were given a score card incorporating the results of their biometric screening and providing them with recommended areas of improvement. The HRA was available as early as one week after the beginning of biometric screening and remained open until two weeks after the last biometric screening. Only participants who completed both the screening and HRA were eligible to participate in the second step of the program.

The second step of iThrive consisted of wellness activities. Eligible participants were offered the opportunity to participate in one of several activities in the fall and then again in the spring. Eligibility to participate in spring wellness activities was not contingent on enrollment or completion of fall activities. In the fall, activities included in-person classes on chronic disease management, weight management, tai chi, physical fitness, financial wellness, and healthy workplace habits; a tobacco quitline; and an online, self-paced wellness challenge. A similar set of activities was offered in the spring. Classes ranged from 6 to 12 weeks in length, and "completion" of a class was generally defined as attending at least three-fourths of the sessions. Participants were given two weeks to enroll in wellness activities and were encouraged to incorporate their HRA feedback when choosing a class.

Study participants were offered monetary rewards for completing each step of the iThrive program, and these rewards varied depending on the treatment group to which an individual was assigned. Individuals in treatment groups labeled A, B, and C were offered a screening incentive of \$0, \$100, or \$200, respectively, for completing the biometric screening and the HRA in the first year. Treatment groups were further split based on an activity incentive of either \$25 or \$75 for each wellness activity completed (up to one per semester). Thus, there were six treatment groups in total: A25, A75, B25, B75, C25, and C75 (see Figure D.1).

The total reward for completing all iThrive components—the screening, the HRA, and a wellness activity during both the fall and spring—ranged from $50 to $350 in the first year, depending on the treatment group. These amounts are in line with typical wellness programs (Mattke, Schnyer and Van Busum, 2012). The probability of assignment to each group was equal across participants, and randomization was stratified by employee class (faculty, staff, or civil service), sex, age, quartile of annual salary, and race (see Appendix D.1.2 for additional randomization details). We privately informed participants about their screening and wellness activity rewards at the start of the intervention (August 2016), and did not disclose information about rewards offered to others.

To help guide participants through iThrive, we developed a secure online website that granted access to information about the program. At the onset of iThrive in August, the website instructed participants to schedule a biometric screening and then to take the online HRA. Beginning in October, and then again in January, the website provided a menu of wellness activities and online registration forms for those activities. The website also provided information on a participant's current progress and rewards earned to date, answers to frequently asked questions, and contact information for participant support.

We implemented a second year of our intervention beginning in August 2017. As in the first year, treatment group participants were offered a biometric screening, a health risk assessment, and various wellness activities (see Appendix Figure D.2 for more details). Our study concluded with a third and final health screening in August 2018. For comparison purposes, we invited both the treatment and control groups to complete all follow-up surveys and screenings in 2017 and 2018. We discuss the second-year intervention in more detail in Section 5.

2.3 Data

We link together several survey and administrative datasets at the individual level. Each data source is summarized in this section and detailed in Appendix Section D.2. Appendix

Table A.16 lists and defines each variable used in the analysis.

2.3.1 University Administrative Data

We obtained university administrative data on 12,459 employees who, as of June 2016, were (1) working at the Urbana-Champaign campus of the University of Illinois and (2) eligible for part-time or full-time employee benefits from the Illinois Department of Central Management Services. The initial denominator file includes employee name, university identification number, contact information (email and home mailing address), date of birth, sex, race, job title, salary, and employee class (faculty, academic staff, or civil service). We used email and home mailing address to invite employees to participate in our study, and we used sex, race, date of birth, salary, and employee class to generate the strata for random sampling.

A second file includes employment history information as of July 31, 2017. This file provides three employment and productivity outcomes that are measured over the first 12 months of our study: job termination date (for any reason, including firings or quits), job title change (since June 2016), and salary raises. The average salary raise in our main sample was 5.9 percent after one year. For those with a job title change in the first year, the average raise was 14.5 percent. A small number (< 5 percent) of employees with job title changes did not receive an accompanying salary raise. We also define an additional variable, "job promotion," which is an indicator for receiving both a title change and a salary raise and thus omits title changes that are potentially lateral moves or demotions.[9] We obtained an updated version of this employment history file on January 31, 2019 for the longer-run analysis presented in Section 5.

A third file provides data on sick leave. The number of sick days taken is available at the monthly level for Civil Service employees. For academic faculty and staff, the number of sick days taken is available biannually, on August 15 and May 15. We first calculate the total number of sick days taken during our pre-period (August 2015–July 2016) and post-period

[9] We did not pre-specify the job promotion or job title change outcomes in our pre-analysis plan.

(August 2016–July 2017) for each employee. We then normalize by the number of days employed to make this measure comparable across employees. All specifications that include sick days taken as an outcome variable are weighted by the number of days employed. Our longer-run analysis, presented in Section 5, uses an updated version of this file that includes a post-period covering August 2016–January 2019.

A fourth file contains data on exact attendance dates for the university's gym and recreational facilities. Entering one of these facilities requires swiping an ID card, which creates a database record linked to the individual's university ID. We calculate the total number of visits per year for the pre-period (August 2015–July 2016) and the post-period (August 2016–July 2017). As with the sick leave data, our longer-run analysis uses an updated version of this file that includes a post-period covering August 2016–January 2019.

2.3.2 Online Survey Data

As described in Section 2.2, all study participants took a 15-minute online survey in July 2016 as a condition of enrollment in the study. The survey covered topics including health status, health care utilization, job satisfaction, and productivity.

Our survey software recorded that, out of the 12,459 employees invited to take the survey, 7,468 employees clicked on the link to the survey, 4,918 employees began the survey, and 4,834 employees completed the survey. Although participants were allowed to skip questions, response rates for the survey were very high: 4,822 out of 4,834 participants (99.7 percent) answered every one of the questions used in our analysis. To measure the reliability of the survey responses, we included a question about age at the end of the survey and compared participants' self-reported ages with the ages available in the university's administrative data. Of the 4,830 participants who reported an age, only 24 (<0.5 percent) reported a value that differed from the university's administrative records by more than one year.

All study participants were also invited via postcard and email to take a one-year follow-

up survey online in July 2017.[10] In addition to the questions asked on the baseline survey, the follow-up survey included additional questions on productivity, presenteeism, and job satisfaction. A total of 3,567 participants (74 percent) successfully completed the 2017 follow-up survey. The completion rates for the control and treatment groups were 75.4 and 73.1 percent, respectively. The difference in completion rates is small but marginally significant ($p = 0.079$).

Finally, we invited all study participants to take a two-year follow-up survey in July 2018. In total, 3,020 participants (62.5 percent) completed the survey. The completion rates for the control and treatment groups were 64.6 and 61.5 percent, respectively. The completion rate difference remains small but becomes more statistically significant ($p = 0.036$). Full texts of our surveys are available in our supplementary materials.[11]

2.3.3 Health Insurance Claims Data

We obtained health insurance claims data for the time period January 1, 2015, through July 31, 2017, for the 67 percent of employees who subscribe to the university's most popular insurance plan. We use the total payment due to the provider to calculate average total monthly spending. We also use the place of service code on the claim to break total spending into four major subcategories: pharmaceutical, office, hospital, and other.[12] Our spending measures include all payments from the insurer to providers, as well as any deductibles or copays paid by individuals.

Employees choose their health plan annually during the month of May, and plan changes become effective July 1. Participants were informed of their treatment assignment on August 9, 2016. We therefore define baseline medical spending to include all allowed amounts with

[10] Invitations to the follow-up survey were sent regardless of current employment status with the university.

[11] Interactive versions of the study surveys are available at http://www.nber.org/workplacewellness.

[12] Pharmaceutical and office-based spending each have their own place of service codes. Hospital spending is summed across the following four codes: "Off Campus - Outpatient Hospital," "Inpatient Hospital," "On Campus - Outpatient Hospital," and "Emergency Room - Hospital." All remaining codes are assigned to "other" spending, which serves as the omitted category in our analysis. We did not pre-specify subcategories of spending in our pre-analysis plan.

dates of service corresponding to the 13-month time period July 1, 2015, through July 31, 2016. We define spending in the post period to correspond to the 12-month time period August 1, 2016, through July 31, 2017. For the longer-run analysis presented in Section 5, we obtained an updated version of the claims file that allowed us to define a post period corresponding to the 30-month period August 1, 2016 through January 31, 2019.

In our health claims sample, 11 percent of employees are not continuously enrolled throughout the 13-month pre-period, and 9 percent are not continuously enrolled throughout the 12-month post-period. This is primarily due to job turnover. Because average monthly spending is measured with less noise for employees with more months of claims, we weight regressions by the number of covered months whenever the outcome variable is average spending.

2.3.4 Illinois Marathon/10K/5K Data

The Illinois Marathon is a running event held annually in Champaign, Illinois. The individual races offered include a marathon, a half marathon, a 5K, and a 10K. When registering for a race, a participant must provide her name, age, sex, and hometown. That information, along with the results of the race, are published online after the races have concluded. We downloaded those data for the 2014-2018 races and matched it to individuals in our dataset using name, age, sex, and hometown.

2.3.5 Employee Productivity Index

To help measure productivity, we construct an index equal to the first principal component of all survey and administrative measures of employee productivity. Appendix Table A.10 shows that this index depends negatively on sick leave and likelihood of job search, and positively on salary raises, job satisfaction, and job promotion.

2.4 Baseline Summary Statistics and Balance Tests

Tables 1a and 1b provide baseline summary statistics for the employees in our sample. Columns (2) and (3) report means for those who were assigned to the control and treatment groups, respectively. Column (1) reports means for employees not enrolled in our study, as available. The variables are grouped into four panels, based on the source and type of data. Panel A presents means of the university administrative data variables used in our stratified randomization, Panel B presents means of variables from our 2016 baseline survey, Panel C presents means of medical spending variables from our health insurance claims data for the July 2015–July 2016 time period, and Panel D presents baseline means of administrative data variables used to measure health behaviors and employee productivity.

Our experimental framework relies on the random assignment of study participants to treatment. To evaluate the validity of this assumption, we test whether the control and treatment means are equal, and whether the variables listed within each panel jointly predict treatment assignment.[13] By construction, we find no evidence of differences in means among the variables used for stratification (Panel A): all p-values in column (4) are greater than 0.7. Among all other variables listed in Panels B, C, and D, we find statistically significant differences at a 10 percent or lower level in 2 out of 34 cases, which is approximately what one would expect from random chance. Our joint balance tests fail to reject the null hypothesis that the variables in Panel B ($p = 0.821$), Panel C ($p = 0.764$), or Panel D ($p = 0.752$) are not predictive of assignment to treatment.

A unique feature of our study is our ability to characterize the employees who declined to participate in our experiment. We investigate the extent of this selection into our study by comparing means for study participants, reported in columns (2)-(3) of Tables 1a and 1b, to the means for non-participating employees who did not complete our baseline survey, reported in column (1). Study participants are younger, are more likely to be female, are more likely to be white, have lower incomes on average, are more likely to be administrative

[13] Appendix Tables A.1a and A.1b report balance tests across sub-treatment arms.

staff, and are less likely to be faculty. They also have lower baseline medical spending, are more likely to have participated in one of the Illinois Marathon/10K/5K running events, and have a higher rate of monthly gym visits. These selection effects mirror the ones we report below in Section 4.2, suggesting that the factors governing the decision to participate in a wellness program are similar to the ones driving the decision to participate in our study.

3 Empirical Methods

3.1 Selection

We first characterize the types of employees who are most likely to complete the various stages of our wellness program in the first year. We estimate the following OLS regression using observations from the treatment group:

$$X_i = \alpha + \theta P_i + \varepsilon_i. \tag{1}$$

The left-hand side variable, X_i, is a pre-determined covariate. The regressor, P_i, is an indicator for one of the following three participation outcomes: completing a screening and HRA, completing a fall wellness activity, or completing a spring wellness activity. The coefficient θ represents the correlation between participation and the baseline characteristic, X_i; it should not be interpreted causally.

3.2 Causal Effects

Next, we estimate the effect of our wellness intervention on a number of outcomes, including medical spending from health claims data, employment and productivity variables measured in administrative and survey data, health behaviors measured in administrative data, and self-reported health status and behaviors. We compare outcomes in the treatment group to

those in the control group using the following specification:

$$Y_i = \alpha + \gamma T_i + \Gamma X_i + \varepsilon_i. \tag{2}$$

Here, T_i is an indicator for membership in the treatment group, and Y_i is an outcome of interest. We estimate equation (2) with and without the inclusion of controls, X_i. In one control specification, X_i includes baseline strata fixed effects. One could also include a much broader set of controls, but doing so comes at the cost of reduced degrees of freedom. Thus, our second control specification implements the Lasso double-selection method of Belloni, Chernozhukov and Hansen (2014), as outlined by Urminsky, Hansen and Chernozhukov (2016), which selects controls that predict either the dependent variable or the focal independent variable.[14] The set of potential controls includes baseline values of the outcome variable, strata variables, the baseline survey variables reported in Table 1a, and all pairwise interactions. We then estimate a regression that includes only the controls selected by double-Lasso. In our tables, we follow convention and refer to this third control strategy as "post-Lasso." As before, our main identifying assumption requires treatment to be uncorrelated with unobserved determinants of the outcome. The key parameter of interest, γ, is the intent-to-treat effect of our intervention on the outcome Y_i.

3.3 Inference

We report conventional robust standard errors in all tables. We do not cluster standard errors because randomization was performed at the individual level (Abadie et al., 2017). Because we estimate equations (1) and (2) for many different outcome variables, the probability that we incorrectly reject at least one null hypothesis is greater than the significance level used for each individual hypothesis test. When appropriate, we address this multiple inference

[14] No control variable will be predictive of a randomly assigned variable, in expectation. Thus, when implementing the double-selection method with randomly assigned treatment status as the focal independent variable, we only select controls that are predictive of the dependent variable. When implementing Lasso, we use the penalty parameter that minimizes 10-fold cross-validated mean squared error.

concern by controlling for the family-wise error rate, i.e. the probability of incorrectly rejecting one or more null hypotheses belonging to a family of hypotheses.

To control for the family-wise error rate, we first define eight mutually exclusive families of hypotheses that encompass all of our outcome variables. Each family contains all variables belonging to one of our four outcome domains (strata variables, medical spending, employment/productivity, or health) and one of our two types of data (administrative or survey).[15] When testing multiple hypotheses using equations (1) and (2), we then calculate family-wise adjusted p-values based on 10,000 bootstraps of the free step-down procedure of Westfall and Young (1993).[16]

4 First-Year Results

4.1 Participation

Figure 2 reports that 56.0 percent of participants in the treatment group completed both the health screening and online HRA in the first year. These participants earned their assigned rewards and were allowed to participate in wellness activities; the remaining 44 percent of the treatment group was not allowed to sign up for these first-year activities. In the fall, 27.4 percent of the treatment group completed enough of the activity to earn their assigned activity reward. Completion rates were slightly lower (22.4 percent) for the spring wellness activities. By way of comparison, a survey of employers with workplace wellness programs found that less than 50 percent of their eligible employees complete health screenings, and that most firms have wellness activity participation rates of less than 20 percent (Mattke

[15] One could assign all variables to a single family of hypotheses. This is unappealing, however, because it assigns equal importance to all outcomes when in fact some outcomes (e.g., total medical spending) are of much greater interest than others. Instead, our approach groups together variables that measure related outcomes and that originate from similar data sources. Because it is based on both survey and administrative data, we assign the productivity index variable to its own (ninth) family.

[16] We have made our generalized Stata code module publicly available for other interested researchers to use. It can be installed by typing "`ssc install wyoung, replace`" at the Stata prompt. We provide additional documentation of this multiple testing adjustment in Appendix C.

et al., 2013). In the second year, participation rates follow a similar qualitative pattern, although the level of participation is shifted down for all activities. This reduction reflects job turnover and may also be due, at least in part, to the smaller size of the rewards offered in the second year.

Except for the year-two screening–which was also offered to the control group–these participation rates quantify the "first-stage" effect of treatment on participation. This is formalized in Appendix Table A.2, which reports the first-stage estimates by regressing completion of each of the eight steps in Figure 2 on an indicator for treatment group membership. In our IV specifications, we use completion of the first-year HRA as the relevant participation outcome in the first stage.

4.2 Selection

4.2.1 Average Selection

Next, we characterize the types of workers most likely to participate in our wellness program. We report selected results in Table 2 and present results for the full set of pre-specified outcomes in Appendix Tables A.3a through A.3d. We test for selection at three different, sequential points in the first year of the study: completing the health screening and HRA; completing a fall wellness activity; and completing a spring wellness activity. Column (1) reports the mean of the selection variable of interest for employees assigned to the treatment group. Columns (3)-(5) report the difference in means between those employees who successfully completed the participation outcome of interest and those who did not. We also report family-wise p-values in brackets that account for the number of selection variables in each "family."[17]

Column (3) of the first row of Table 2 reports that employees who completed the screen-

[17]The eight families of outcome variables are defined in Section 3.3. The family-wise p-values reported in Table 2 account for all the variables in the family, including ones that are not reported in the main text. An expanded version of Table 2 that reports estimates for all pre-specified outcomes is provided in Appendix Tables A.3a through A.3d.

ing and HRA spent, on average, $115.3 per month less on health care in the 13 months prior to our study than employees who did not participate. This pattern of advantageous selection is strongly significant using conventional inference ($p = 0.027$), and remains marginally significant after adjusting for the five outcomes in this family (family-wise $p = 0.082$). The magnitude is also economically significant, representing 24 percent of the $479 in average monthly spending (column (1)). Columns (4) and (5) present further evidence of advantageous selection into the fall and spring wellness activities, although in these cases the magnitude of selection falls by half and becomes statistically insignificant.

In contrast, the second row of Table 2 reports that employees participating in our wellness program were *more* likely to have non-zero medical spending at baseline than non-participants, by about 5 percentage points (family-wise $p \leq 0.02$), for all three participation outcomes. When combined with our results from the first row on average spending, this suggests that our wellness program is more attractive to employees with moderate spending than to employees in either tail of the spending distribution.

We investigate these results further in Figure 3, which displays the empirical distributions of prior spending for those employees who participated in screening and for those who did not. Pearson's chi-squared test and the non-parametric Kolmogorov-Smirnov test both strongly reject the null hypothesis that these two samples were drawn from the same distribution (Chi-squared $p < 0.001$; Kolmogorov-Smirnov $p = 0.006$).[18] Figure 3 reveals a "tail-trimming" effect: participating (screened) employees are less likely to be high spenders ($> \$2,338$ per month), but they are also less likely to be low spenders ($0 per month). Because medical spending is right-skewed, the overall effect on the mean among participants is negative, which explains the advantageous selection effect reported in the first row of Table 2.

Panel B of Table 2 reveals negative selection on our productivity index, a summary measure of productivity. This result is driven in part by positive selection on prior sick leave taken and negative selection on working over 50 hours per week and on salary. The

[18] These tests were not specified in our pre-analysis plan.

average annual salary of participants is lower than that of non-participants, significantly so for the fall and spring wellness activities (family-wise $p \leq 0.012$). This initially suggests that participants are disproportionately lower-income. Yet, the share of screening participants in the first (bottom) quartile of income is actually 6.9 percentage points *lower* than the share among non-participants (family-wise $p < 0.001$). Columns (4) and (5) also report negative, albeit smaller, selection effects for the fall and spring wellness activities. We again delve deeper by comparing the entire empirical distributions of income for participants and non-participants in Figure 4. We can reject that these two samples came from the same distribution ($p \leq 0.002$). As in Figure 3, we again find a tail-trimming effect: participating employees are less likely to come from either tail of the income distribution.

Lastly, we test for differences in baseline health behaviors as measured by our administrative data variables. The first row of Panel C in Table 2 reports that the share of screening participants who had previously participated in one of the IL Marathon/5K/10K running events is 8.9 percentage points larger than the share among non-participants (family-wise $p < 0.001$), a sizeable difference that represents over 75 percent of the mean participation rate of 11.8 percent (column (1)). This selection effect is even larger for the fall and spring wellness activities. The second row of Panel C reports that participants also visited the campus gym facilities more frequently, although these selection effects are only statistically significant for screening and HRA completion (family-wise $p = 0.013$).

Prior studies have raised concerns that the benefits of wellness programs accrue primarily to higher-income employees with lower health risks (Horwitz, Kelly and DiNardo, 2013). Our results are broadly consistent with these concerns: participating employees are less likely to have very high medical spending, less likely to be in the bottom quartile of income, and more likely to engage in healthy activities such as running or visiting the gym. At the same time, participating employees are also less likely to have very low medical spending or have very high incomes, which suggests a more nuanced story. In addition, we find that less productive employees are more likely to participate, particularly in the wellness activity portion of the

program, suggesting that it may be less costly for these employees to devote time to the program.

4.2.2 Health Care Cost-Savings via Selection

The selection patterns we have uncovered may provide, by themselves, a potential motive for firms to offer wellness programs. We have shown that wellness participants have lower medical spending on average than non-participants. If wellness programs differentially increase the recruitment or retention of these types of employees, then the accompanying reduction in health care costs will save firms money.[19]

A simple back-of-the-envelope calculation demonstrates this possibility. In our setting, 39 percent ($= 4,834/12,459$) of eligible employees enrolled into our study, and 56 percent of the treatment group completed a screening and health assessment (Figure 2). Participating employees spent on average $138.2 per month less than non-participants in the post-period (Table 4, column 4), which translates into an annual spending difference of $1,658. When combined with average program costs of $271 per participant, this implies that the employer would need to increase the share of employees who are similar to wellness participants by 4.3 (e.g. $0.39 \times 0.56 \times 271/(1658 - 271)$) percentage points in order for the resulting reduction in medical spending to offset the entire cost of the wellness program. To be clear, this calculation does not assume or imply that adoption of workplace wellness programs is socially beneficial. But, it does provide a profit-maximizing rationale for firms to adopt wellness programs, even in the absence of any direct effects on health, productivity, or medical spending. Section 5, however, will show that we do not find any effects on retention after 30 months, so if this effect exists in our setting then it needs to operate through a recruitment channel, which we cannot estimate using our study design.

[19] Wellness participants differ from non-participants along other dimensions as well (e.g., health behaviors). Because it is difficult in many cases to sign, let alone quantify, a firm's preferences over these other dimensions, we focus our cost-savings discussion on the medical spending consequences.

4.3 Causal Effects

4.3.1 Intent-to-Treat

We estimate the causal, intent-to-treat (ITT) effect of our intervention on three domains of outcomes: medical spending, employment and productivity, and health behaviors. Table 3 reports estimates of equation (2) for selected outcomes. An expanded version of this table reporting results for all 42 administrative and survey outcomes is provided in Appendix Tables A.4a through A.4g.

We report ITT estimates using two specifications. The first includes no control variables. The second specification includes a set of baseline outcomes and covariates chosen via Lasso, as described in Section 3.2. Because the probability of treatment assignment was constant across strata, these controls are included not to reduce bias, but to improve the precision of the treatment effect estimates (Bruhn and McKenzie, 2009). For completeness, the appendix tables also report a third control specification that includes fixed effects for the 69 strata used for stratified random assignment at baseline.

Medical spending We do not detect statistically significant effects of treatment on average medical spending over the first 12 months (August 2016–July 2017) of the wellness intervention in any of our specifications. Column (2) of the first row of Table 3 shows that average monthly spending was $10.8 higher in the treatment group than in the control group. The point estimate increases slightly when using the post-Lasso control strategy (column (3)) but remains small and statistically indistinguishable from zero. The post-Lasso specification improves the estimate's precision, with a standard error about 24 percent smaller than that of the no-control specification. Columns (2)–(3) of Panel A also show small and insignificant effects for different subcategories of spending and the probability of any spending over this 12-month period.

Panels (a) and (b) of Figure 5 graphically reproduce the null average treatment effects presented in Panel A, column (2), of Table 3 for total and non-zero spending. Despite

null effects on average, there may still exist mean-preserving treatment effects that alter other moments of the spending distribution. However, Panel (c) of Figure 5 shows that the empirical distributions of spending are observationally similar for both the treatment and control groups. This similarity is formalized by a Pearson's chi-squared test and a Kolmogorov-Smirnov test, which both fail to reject the null hypothesis that the control and treatment samples were drawn from the same spending distribution ($p = 0.828$ and $p = 0.521$, respectively).

Employment and productivity Next, we estimate the effect of treatment on various employment and productivity outcomes. Columns (2)–(3) of Table 3, Panel B, summarize our findings while Appendix Tables A.4c and A.4d report estimates for all administrative and pre-specified survey productivity measures. We do not detect statistically significant effects after 12 months of the wellness intervention on any of our administratively measured outcomes, including annual salary, the probability of job promotion or job termination, and sick leave taken. Among self-reported employment and productivity outcomes measured by the one-year follow-up survey, we find no statistically significant effects on most measures, including being happier at work than last year or feeling very productive at work. The only exception is that individuals in the treatment group are 5.7 percentage points (7.2 percent) more likely (family-wise $p = 0.001$) to believe that management places a priority on health and safety (column (2), Table 3). The treatment effect on the 12-month productivity index, equal to the first principal component of all 12-month survey and administrative employment and productivity outcomes, is statistically insignificant.

Column (1) of Table 3, Panel B, reports that 17.6 percent of our sample had received a promotion and 11.3 percent had ceased employment by the end of the first year, suggesting that our null estimates are not due to stickiness in career progression.[20] A more serious concern is whether our productivity measures are sufficiently meaningful and/or precise to

[20]There is even less stickiness in the longer-run estimates reported in Section 5, where our precision allows us to reject small increases in productivity during the first 30 months following randomization.

draw conclusions. Following Baker, Gibbs and Holmstrom (1994), we cross-validate our administrative measures of employment and productivity, comparing each to our survey measures of work and productivity. As reported in Table A.11, we find a strong degree of concordance between the independently-measured administrative and survey variables. The eighth row of column (3) reports that individuals who self-report receiving "a promotion or more responsibility at work" are 22.5 percent more likely to have an official title change in our administrative data, and column (2) reports that they are 22.9 percent more likely to have received a promotion, which we define as having both a job title change *and* a non-zero salary raise.[21] More generally, our administrative measure of promotion is positively correlated with self-reported job satisfaction and happiness at work, and negatively correlated with self-reported job search. Likewise, the first row of column (5) reports that survey respondents who indicated they had taken any sick days were recorded in the administrative data as taking 3.2 more sick days than respondents who had not indicated taking sick days. The high overall agreement between our survey and administrative variables both increases our confidence in their accuracy and validates their relevance as measures of productivity.

Health behaviors Finally, we investigate health behaviors, which may respond more quickly to a wellness intervention than medical spending or productivity. Our main results are reported in columns (2)–(3) of Table 3, Panel C. We find small and statistically insignificant treatment effects on participation in any running event of the April 2017 Illinois Marathon (i.e. 5K, 10K, and half/full marathons). Similarly, we do not find meaningful effects on the average number of days per month that an employee visits a campus recreation facility. However, we do find that individuals in the treatment group are nearly 4 percentage points more likely (family-wise $p = 0.001$) to report ever having a previous health screening. This effect indicates that our intervention's biometric health screenings did not simply crowd out screenings that would have otherwise occurred within the first year of our study.

[21] As discussed in Section 2.3, less than five percent of employees with job title changes did not also have a salary raise. We obtain a similar causal effect estimate if we look only at job title changes rather than our constructed promotion measure (see Appendix Table A.4c).

Discussion Across all 42 outcomes we examine, we find only two statistically significant effects of our intervention after one year: an increase in the number of employees who ever received a health screening, and an increase in the number who believe that management places a priority on health and safety.[22] The next section addresses the precision of our estimates by quantifying what effects we can rule out. But first, we mention a few caveats.

First, these results only include one year of data. While we do not find significant effects for most of the outcomes we examine, it is possible that longer-run effects may emerge in later years, so we turn to this issue in Section 5. Second, our analysis assumes that the control group was unaffected by the intervention. The research team's contact with the control group in the first year was confined to the communication procedures employed for the 2016 and 2017 online surveys. Although we never shared details of the intervention with members of the control group, they may have learned or been affected by the intervention through peer effects. However, we think peer effects are unlikely to explain our null findings. We asked study participants on the 2017 follow-up survey whether they ever talked about the iThrive workplace wellness program with any of their coworkers. Only 3 percent of the control group responded affirmatively, compared to 44 percent of the treatment group. Moreover, the cluster-randomized trial of Song and Baicker (2019), which has a design that naturally accommodates peer effects, also finds null effects of a comprehensive workplace wellness program.

Finally, our results do not rule out the possibility of meaningful treatment effect heterogeneity. There may exist subpopulations who did benefit from the intervention, or who would have benefited had they participated. Wellness programs vary considerably across employers, and another design that induces a different population to participate, such as by foregoing a biometric screening, may achieve different results from what we find here.

[22] We show in the appendix that these two effects are driven by the health screening component of our intervention rather than the wellness activity component.

4.3.2 Comparison to Prior Studies

We now compare our estimates to the prior literature, which has focused on medical spending and absenteeism. This exercise employs a spending estimate derived from a data sample that winsorizes (top-codes) medical spending at the one percent level (see Column 3 of Table A.13). We do this to reduce the influence of a small number of extreme outliers on the precision of our estimate, as has been done in prior studies (e.g. Clemens and Gottlieb, 2014).[23]

Figure 6 illustrates how our estimates compare to the prior literature.[24] The top-left figure in Panel (a) plots the distribution of the intent-to-treat (ITT) point estimates for medical spending from 22 prior workplace wellness studies. The figure also plots our ITT point estimate for total medical spending from Table 3 and shows that our 95-percent confidence interval rules out 20 of these 22 estimates. For ease of comparison, all effects are expressed as percent changes. The bottom-left figure in Panel (a) plots the distribution of treatment-on-the-treated (TOT) estimates for health spending from 33 prior studies, along with the IV estimates from our study. In this case, our 95-percent confidence interval rules out 23 of the 33 studies. Overall, our confidence intervals rule out 43 of 55 (78 percent) prior ITT and TOT point estimates for health spending.[25] The two figures in Panel (b) repeat this exercise for absenteeism, and show that our estimates rule out 51 of 57 (89 percent) prior ITT and TOT point estimates for absenteeism. Across both sets of outcomes, we rule out 94 of 112 (84 percent) prior estimates. If we restrict our comparison to just the studies that lasted 12 months or less, we rule out 39 of 47 (83 percent) prior estimates, and if we restrict our comparison to only the set of RCTs, we rule out 21 of 22 (95 percent) prior estimates. If we combine RCTs and studies that use a pre/post design, we continue to rule out 68 of

[23] Winsorizing can introduce bias if there are heterogeneous treatment effects in the tails of the spending distribution. However, Figure 5c provides evidence of a consistently null treatment effect throughout the spending distribution. This evidence is further supported by Table A.13, which shows that the point estimate of the medical spending treatment effect changes little after winsorization. For completeness, Appendix Figure A.1 illustrates the stability of the point estimate across a wide range of winsorization levels.

[24] Appendix B provides the sources and calculations underlying the point estimates reported in Figure 6.

[25] If we do not winsorize medical spending, we rule out 40 of 55 (73 percent) prior health studies.

81 (84 percent) prior estimates.

We can also combine our spending and absenteeism estimates with our cost data to calculate a return on investment (ROI) for workplace wellness programs. The 99 percent confidence intervals for the ROI associated with our intervention rule out the widely cited savings estimates reported in the meta-analysis of Baicker, Cutler and Song (2010).[26] One reason for the divergence between our estimates and prior findings may be selection bias in observational studies, which we explore below in 4.3.3. However, our estimates differ even when we restrict comparisons to prior RCTs. Another possible explanation in these cases is publication bias. Using the method of Andrews and Kasy (Forthcoming) on the subset of prior studies that report standard errors ($N = 40$), our results in Appendix Table A.15 suggest that the bias-corrected mean effect in these studies is negative but insignificant ($p = 0.14$). Furthermore, studies with p-values greater than 0.05 appear to be nearly one-third as likely to be published as studies with significantly negative effects on spending and absenteeism.

4.3.3 IV versus OLS

As shown above, our results differ from many prior studies that find workplace wellness programs significantly reduce health expenditures and absenteeism. One possible reason for this discrepancy is that our results may not generalize to other workplace populations or programs. A second possibility is the presence of advantageous selection bias in these other studies, which are generally not randomized controlled trials (Oster, 2019). We investigate the potential for signficiant selection bias to explain this difference by performing a typical observational (OLS) analysis and comparing its results to those of our experimental

[26] The first year of the iThrive program cost \$152 ($= \$271 \times 0.56$) per person assigned to treatment. This is a conservative estimate because it does not account for paid time off or the fixed costs of managing iThrive. Focusing on the first year of our intervention and assuming that the cost of a sick day equals \$240, we calculate that the lower bounds of the 99 percent confidence intervals for annual medical and absenteeism costs are -\$396 ($= (17.2 - 2.577 \times 19.5) \times 12$) and -\$91 ($= (0.138 - 2.577 \times 0.200) \times 240$), which imply ROI lower bounds of 2.61 and 0.60, respectively. By comparison, Baicker, Cutler and Song (2010) found that spending fell by \$3.27, and absenteeism costs fell by \$2.73, for every dollar spent on wellness programs.

estimates.[27] Specifically, we estimate

$$Y_i = \alpha + \gamma P_i + \Gamma X_i + \varepsilon_i, \tag{3}$$

where Y_i is the outcome variable as in (2), P_i is an indicator for participating in the screening and HRA, and X_i is a vector of variables that control for potentially non-random selection into participation.

We estimate two variants of equation (3). The first is an instrumental variables (IV) specification that includes observations for individuals in the treatment or control groups, and uses treatment assignment as an instrument for completing the first-year screening and HRA. The second variant estimates equation (3) using OLS, restricted to individuals in the treatment group. For each of these two variants, we estimate three specifications similar to those used for the ITT analysis described above (no controls, strata fixed effects, and post-Lasso).[28] This generates six estimates for each outcome variable. Table 4 reports the "no controls" and "post-Lasso" results for our primary outcomes of interest. Results for all specifications, including strata fixed effects, and all pre-specified administrative and survey outcomes are reported in Appendix Tables A.5a-A.5h. Comparing OLS estimates to IV estimates for the post-Lasso specification, which chooses controls from a large set of variables, illustrates the extent to which rich controls can mitigate selection bias in an observational analysis.

As with the ITT analysis, the IV estimates reported in columns (1)-(2) are small and indistinguishable from zero for nearly every outcome. By contrast, the observational estimates reported in columns (3)-(4) are frequently large and statistically significant. Moreover, the

[27] This observational analysis was not specified in our pre-analysis plan.

[28] To select controls for the post-Lasso IV specification, we follow the "triple" selection strategy proposed in Chernozhukov, Hansen and Spindler (2015). This strategy first estimates three Lasso regressions of (1) the (endogenous) focal independent variable on all potential controls and instruments; (2) the focal independent variable on all potential controls; and (3) the outcome on all potential controls. It then forms a 2SLS estimator using instruments selected in step (1) and all controls selected in any of the steps (1)-(3). When the instrument is randomly assigned, as it is in our setting, the set of controls selected in steps (1)-(2) above will be the same, in expectation. Thus, we form our 2SLS estimator using treatment assignment as the instrument and controls selected in Lasso steps (2) or (3) of this algorithm.

IV estimate rules out the OLS estimate for several outcomes. Based on our most precise and well-controlled specification (post-Lasso), the OLS monthly spending estimate of −$103.8 (row 1, column (4)) lies outside the 99 percent confidence interval of the IV estimate of $52.3 with a standard error of $59.4 (row 1, column (2)). For participation in the 2017 IL Marathon/10K/5K, the OLS estimate of 0.024 lies outside the 99 percent confidence interval of the corresponding IV estimate of -0.011. For campus gym visits, the OLS estimate of 2.160 lies just inside the 95 percent confidence interval of the corresponding IV estimate of 0.757. Under the assumption that the IV (RCT) estimates are asymptotically consistent, these differences imply that even after conditioning on a rich set of controls, participants selected into our workplace wellness program on the basis of lower-than-average contemporaneous spending and healthier-than-average behaviors. This selection bias is consistent with the evidence presented in Section 3.1 that pre-existing spending is lower, and pre-existing behaviors are healthier, among participants than among non-participants.

Moreover, the observational estimates presented in columns (4)-(6) are in line with estimates from previous observational studies, which suggests that our setting is not particularly unique. In the spirit of LaLonde (1986), these estimates demonstrate that even well-controlled observational analyses can suffer from significant selection bias, suggesting that similar biases are present in other wellness program settings as well.

5 Longer-Run Results

The first year of our intervention concluded in July 2017. We continued to offer the iThrive wellness program to the treatment group for a second year (August 2017 - July 2018). We maintained the same basic structure as in the first year, but offered smaller incentives—a design choice influenced both by a smaller budget and the diminishing effect of incentives on participation that we observed during the first year.[29] In particular, the second year of

[29] Appendix Figure D.2 illustrates the structure of incentives and treatments offered in the second year of the wellness program.

iThrive again included a health screening, an online health assessment, and a set of wellness activities offered in both the fall and spring semesters. iThrive officially ended in September 2018 with a third and final health screening.

This section reports estimates of the causal, intent-to-treat effect of our two-year intervention on longer-run outcomes using data that extend up to two-and-a-half years (30 months) post-randomization. We note that our study design entailed offering follow-up health screenings to the treatment *and* control groups in 2017 and 2018, one and two years after the intervention began, respectively. This means the control group received a partial treatment, which potentially attenuates treatment effect estimates beyond 12 months for outcomes affected by screening in the short run. However, the scope for attenuation is limited. Control group participants were eligible only to receive a health screening; they were ineligible for both the health risk assessment and the wellness activities. Moreover, we know from our estimates above that even the full intervention—screening, health risk assessment, and wellness activities—had little effect on most outcomes during the first 12 months.

Columns (5)–(6) of Table 3 summarize our primary treatment effect estimates after 24 months for survey outcomes and 30 months for admin outcomes (time horizons based on data availability).[30] Overall, the longer-run estimates are qualitatively similar to those from the one-year analysis. Notably, we continue to find no effects on job promotion, despite a mean 30-month promotion rate of 36.0 percent. The 30-month effect on job termination, which at 12 months was insignificant at -1.2 percentage points, is now very close to zero (0.2 percentage points), despite a mean 30-month termination rate of 20.4 percent. Our 95-percent confidence interval for job termination rules out a positive retention effect of 2.4 percentage points (12.0 percent) for iThrive. For perspective, this upper bound is well below the 4.3 percentage points needed to generate the screening savings discussed in Section 4.2.2.

Although we previously found that individuals in the treatment group were more likely to believe management places a priority on health and safety after the first year, the two-year

[30]Longer-run results for all outcomes and control specifications are shown in Appendix Tables A.9a–A.9g.

estimate is attenuated and is no longer statistically significant in our preferred (post-Lasso) specification. We continue to find that individuals in the treatment group are more likely to report having a previous health screening, and this effect remains statistically significant (family-wise $p = 0.005$).

The point estimate for 30-month total medical spending is lower than the first-year estimates and the standard error has increased. The reduction in precision is likely caused by outliers, as described previously in Section 4.3.2. As with our 12-month estimates, we reduce the influence of outliers by winsorizing at the one percent level. Spending estimates at various levels of winsorization are presented in Table A.14. For one percent winsorization (column (3)), we estimate an intent-to-treat effect of \$5.7 with a 95 percent confidence interval of $[-33.8, 45.1]$. This is very similar to the winsorized 12-month estimate of \$17.2 and 95 percent confidence interval of $[-21.0, 55.3]$ (column (3) of Table A.13).

Increasing the length of the follow-up window raises concerns about the potential for differential attrition between the control and treatment groups. However, Appendix Table A.12 shows that health insurance enrollment is nearly identical in the control and treatment groups over both the 12-month and 30-month post-periods. In addition, the rates of job exit, which measure sample attrition for outcomes derived from University administrative data, and the rates of completion for the one-year follow-up survey are also similar. We do detect a small but statistically significant difference in completion rates for the two-year (2018) follow-up survey. The completion rates remain fairly high for both the treatment and control groups, but the difference in completion suggests that outcomes derived from the two-year follow-up survey should potentially be weighted less than those from other data sources.

6 Conclusion

This paper evaluates a comprehensive workplace wellness program. We find that employees who chose to participate in our wellness program were less likely to be in the bottom quartile

of the income distribution, and already had lower medical spending and healthier behaviors than non-participants prior to our intervention. These selection effects imply that workplace wellness programs may shift costs onto low-income employees with high health care spending and poor health habits. Moreover, the large magnitude of our selection on prior spending suggests that a potential value of wellness programs to firms may be their potential to attract and retain workers with low health care costs.

Our two-year wellness program increased lifetime health screening rates, but had no effects on medical spending, health behaviors, or employee productivity after 30 months. Our null results are economically meaningful: we can rule out 84 percent of the medical spending and absenteeism estimates from the prior literature, along with the average ROIs calculated by Baicker, Cutler and Song (2010) in a widely cited meta-analysis. Our OLS estimate is consistent with results from the prior literature, but ruled out by our IV estimate, suggesting that non-RCT studies in this literature suffer from selection bias.

Well-designed studies have found that monetary incentives can successfully promote exercise (e.g., Charness and Gneezy, 2009), and there is ample evidence that exercise improves health (e.g., Warburton, Nicol and Bredin, 2006). However, both our 30-month study and the 18-month study of Song and Baicker (2019) find null effects of workplace wellness on primary outcomes of interest, despite using different program and randomization designs and examining different populations. These null findings underscore the challenges to achieving health benefits with large-scale wellness interventions, a point echoed by Cawley and Price (2013). One potential explanation for these disappointing results could be that those who benefit the most (e.g., smokers and those with high medical costs) decline to participate, even when offered large monetary incentives. An improved understanding of participation decisions would help wellness programs better target these individuals.

References

Abadie, Alberto, Susan Athey, Guido Imbens, and Jeffrey Wooldridge. 2017. "When Should You Adjust Standard Errors for Clustering?" *NBER Working Paper*

#24003.

Abraham, Jean, and Katie M White. 2017. "Tracking The Changing Landscape Of Corporate Wellness Companies." *Health Affairs*, 36(2): 222–228.

Aldana, Steven G. 2001. "Financial impact of health promotion programs: a comprehensive review of the literature." *American Journal of Health Promotion*, 15(5): 296–320.

Andrews, Isaiah, and Maximilian Kasy. Forthcoming. "Identification of and Correction for Publication Bias." *The American Economic Review*.

Baicker, Katherine, David Cutler, and Zirui Song. 2010. "Workplace wellness programs can generate savings." *Health Affairs*, 29(2): 304–311.

Baker, George, Michael Gibbs, and Bengt Holmstrom. 1994. "The Internal Economics of the Firm: Evidence from Personnel Data." *The Quarterly Journal of Economics*, 109(4): 881–919.

Baxter, Siyan, Kristy Sanderson, Alison J Venn, C Leigh Blizzard, and Andrew J Palmer. 2014. "The relationship between return on investment and quality of study methodology in workplace health promotion programs." *American Journal of Health Promotion*, 28(6): 347–363.

Belloni, Alexandre, Victor Chernozhukov, and Christian Hansen. 2014. "Inference on treatment effects after selection among high-dimensional controls." *The Review of Economic Studies*, 81(2): 608–650.

Bruhn, Miriam, and David McKenzie. 2009. "In Pursuit of Balance: Randomization in Practice in Development Field Experiments." *American Economic Journal: Applied Economics*, 1(4): 200–232.

Burd, Steven A. 2009. "How Safeway Is Cutting Health-Care Costs." *The Wall Street Journal*. http://www.wsj.com/articles/SB124476804026308603.

Cawley, John. 2014. "The Affordable Care Act permits greater financial rewards for weight loss: a good idea in principle, but many practical concerns remain." *Journal of Policy Analysis and Management*, 33(3): 810–820.

Cawley, John, and Joshua A Price. 2013. "A case study of a workplace wellness program that offers financial incentives for weight loss." *Journal of Health Economics*, 32(5): 794–803.

Chapman, Larry S. 2012. "Meta-evaluation of worksite health promotion economic return studies: 2012 update." *American Journal of Health Promotion*, 26(4): 1–12.

Charness, Gary, and Uri Gneezy. 2009. "Incentives to exercise." *Econometrica*, 77(3): 909–931.

Chernozhukov, Victor, Christian Hansen, and Martin Spindler. 2015. "Post-Selection and Post-Regularization Inference in Linear Models with Many Controls and Instruments." *American Economic Review*, 105(5): 486–90.

Clemens, Jeffrey, and Joshua D. Gottlieb. 2014. "Do Physicians' Financial Incentives Affect Medical Treatment and Patient Health?" *American Economic Review*, 104(4): 1320–1349.

Gowrisankaran, Gautam, Karen Norberg, Steven Kymes, Michael E Chernew, Dustin Stwalley, Leah Kemper, and William Peck. 2013. "A hospital system's wellness program linked to health plan enrollment cut hospitalizations but not overall costs." *Health Affairs*, 32(3): 477–485.

Gubler, Timothy, Ian Larkin, and Lamar Pierce. 2017. "Doing well by making well: The impact of corporate wellness programs on employee productivity." *Management Sci-*

ence.

Haisley, Emily, Kevin G Volpp, Thomas Pellathy, and George Loewenstein. 2012. "The impact of alternative incentive schemes on completion of health risk assessments." *American Journal of Health Promotion*, 26(3): 184–188.

Handel, Benjamin, and Jonathan Kolstad. 2017. "Wearable Technologies and Health Behaviors: New Data and New Methods to Understand Population Health." *American Economic Review: Papers and Proceedings*, 107(5): 481–85.

Horwitz, Jill R, Brenna D Kelly, and John E DiNardo. 2013. "Wellness incentives in the workplace: cost savings through cost shifting to unhealthy workers." *Health Affairs*, 32(3): 468–476.

Jaspen, Bruce. 2015. "Employers Boost Wellness Spending 17% From Yoga to Risk Assessments." *Forbes Online*. http://www.forbes.com/sites/brucejapsen/2015/03/26/employers-boost-wellness-spending-17-from-yoga-to-risk-assessments/#6a37ebf2350f.

LaLonde, Robert J. 1986. "Evaluating the Econometric Evaluations of Training Programs with Experimental Data." *The American Economic Review*, 76(4): 604–620.

Lazear, Edward P. 2000. "Performance pay and productivity." *American Economic Review*, 90(5): 1346–1361.

Liu, Tim, Christos Makridis, Paige Ouimet, and Elena Simintzi. 2017. "Is Cash Still King: Why Firms Offer Non-Wage Compensation and the Implications for Shareholder Value." Available at SSRN: https://ssrn.com/abstract=3088067.

Mattke, Soeren, Christopher Schnyer, and Kristin R Van Busum. 2012. "A review of the US workplace wellness market." *The RAND Corporation*, Occasional Paper Series, https://www.dol.gov/sites/default/files/ebsa/researchers/analysis/health-and-welfare/workplacewellnessmarketreview2012.pdf.

Mattke, Soeren, Hangsheng Liu, John Caloyeras, Christina Y Huang, Kristin R Van Busum, Dmitry Khodyakov, and Victoria Shier. 2013. "Workplace wellness programs study: Final report." *RAND Health Quarterly*, 3(2).

McIntyre, Adrianna, Nicholas Bagley, Austin Frakt, and Aaron Carroll. 2017. "The dubious empirical and legal foundations of workplace wellness programs." *Health Matrix*, 27: 59.

Meenan, Richard T, Thomas M Vogt, Andrew E Williams, Victor J Stevens, Cheryl L Albright, and Claudio Nigg. 2010. "Economic evaluation of a worksite obesity prevention and intervention trial among hotel workers in Hawaii." *Journal of occupational and environmental medicine/American College of Occupational and Environmental Medicine*, 52(Suppl 1): S8.

Oster, Emily. 2019. "Behavioral Feedback: Do Individual Choices Influence Scientific Results?" Working Paper.

Oyer, Paul. 2008. "Salary or benefits?" In *Work, Earnings and Other Aspects of the Employment Relation*. 429–467. Emerald Group Publishing Limited.

Pelletier, Kenneth R. 2011. "A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: update VIII 2008 to 2010." *Journal of occupational and environmental medicine*, 53(11): 1310–1331.

Reynolds, Chelsea. 2010. "Myth Surrounds Reform's 'Safeway Amendment." *Covering Health*. http://healthjournalism.org/blog/2010/01/

myth-surrounds-reforms-safeway-amendment/.

Royer, Heather, Mark Stehr, and Justin Sydnor. 2015. "Incentives, commitments, and habit formation in exercise: evidence from a field experiment with workers at a fortune-500 company." *American Economic Journal: Applied Economics*, 7(3): 51–84.

Ryde, Gemma C, Nicholas D Gilson, Nicola W Burton, and Wendy J Brown. 2013. "Recruitment rates in workplace physical activity interventions: characteristics for success." *American Journal of Health Promotion*, 27(5): e101–e112.

Saunders, Rob, Madhu Vulimiri, Mark Japinga, William Bleser, and Charlene Wong. 2018. "Are Carrots Good for Your Health? Current Evidence on Health Behavior Incentives in the Medicaid Program." Duke Margolis Center for Health Policy.https://healthpolicy.duke.edu/sites/default/files/atoms/files/duke_healthybehaviorincentives_6.1.pdf.

Soler, Robin E, Kimberly D Leeks, Sima Razi, David P Hopkins, Matt Griffith, Adam Aten, Sajal K Chattopadhyay, Susan C Smith, Nancy Habarta, Ron Z Goetzel, et al. 2010. "A systematic review of selected interventions for worksite health promotion: the assessment of health risks with feedback." *American Journal of Preventive Medicine*, 38(2): S237–S262.

Song, Zirui, and Katherine Baicker. 2019. "Effect of a workplace wellness program on employee health and economic outcomes: a randomized clinical trial." *Jama*, 321(15): 1491–1501.

Terry, Paul E, Jinnet Briggs Fowles, Min Xi, and Lisa Harvey. 2011. "The ACTIVATE study: results from a group-randomized controlled trial comparing a traditional worksite health promotion program with an activated consumer program." *American Journal of Health Promotion*, 26(2): e64–e73.

The Kaiser Family Foundation and Health Research and Educational Trust. 2016*a*. "Employer Health Benefits: 2016 Annual Survey." http://files.kff.org/attachment/Report-Employer-Health-Benefits-2016-Annual-Survey.

The Kaiser Family Foundation and Health Research and Educational Trust. 2016*b*. "Workplace Wellness Programs Characteristics and Requirements." http://files.kff.org/attachment/Issue-Brief-Workplace-Wellness-Programs-Characteristics-and-Requirements.

The Kaiser Family Foundation and Health Research and Educational Trust. 2017. "Employer Health Benefits: 2017 Annual Survey." http://files.kff.org/attachment/Report-Employer-Health-Benefits-Annual-Survey-2017.

Urminsky, Oleg, Christian Hansen, and Victor Chernozhukov. 2016. "Using Double-Lasso Regression for Principled Variable Selection."

Volpp, Kevin G, David A Asch, Robert Galvin, and George Loewenstein. 2011. "Redesigning employee health incentives—lessons from behavioral economics." *New England Journal of Medicine*, 365(5): 388–390.

Volpp, Kevin G, Leslie K John, Andrea B Troxel, Laurie Norton, Jennifer Fassbender, and George Loewenstein. 2008. "Financial incentive–based approaches for weight loss: a randomized trial." *Journal of the American Medical Association*, 300(22): 2631–2637.

Warburton, Darren ER, Crystal Whitney Nicol, and Shannon SD Bredin. 2006. "Health benefits of physical activity: the evidence." *Canadian Medical Association Journal*, 174(6): 801–809.

Westfall, Peter H, and S Stanley Young. 1993. *Resampling-based multiple testing:*

Examples and methods for p-value adjustment. Vol. 279, John Wiley & Sons.

Figure 1: Experimental Design of the Illinois Workplace Wellness Study

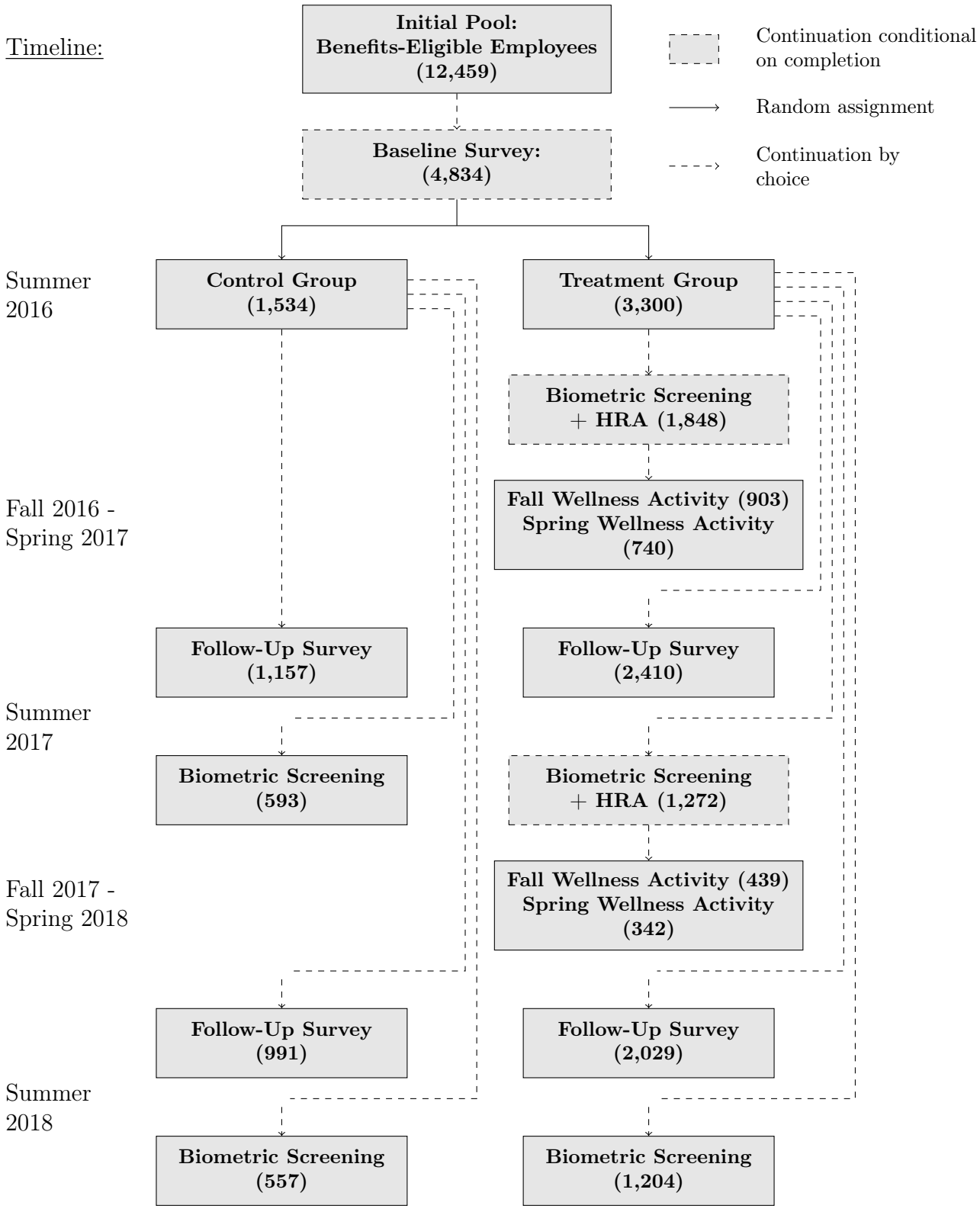
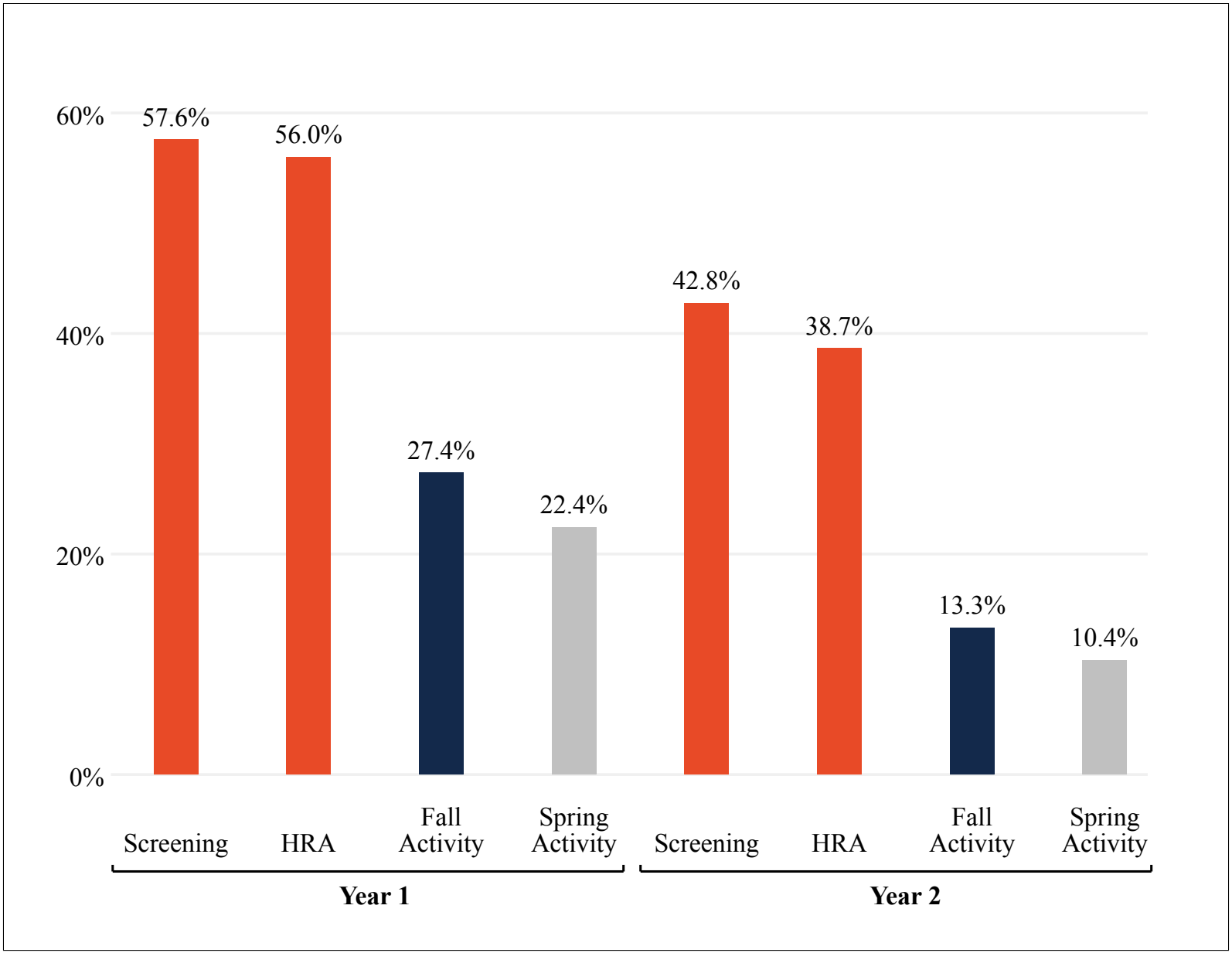
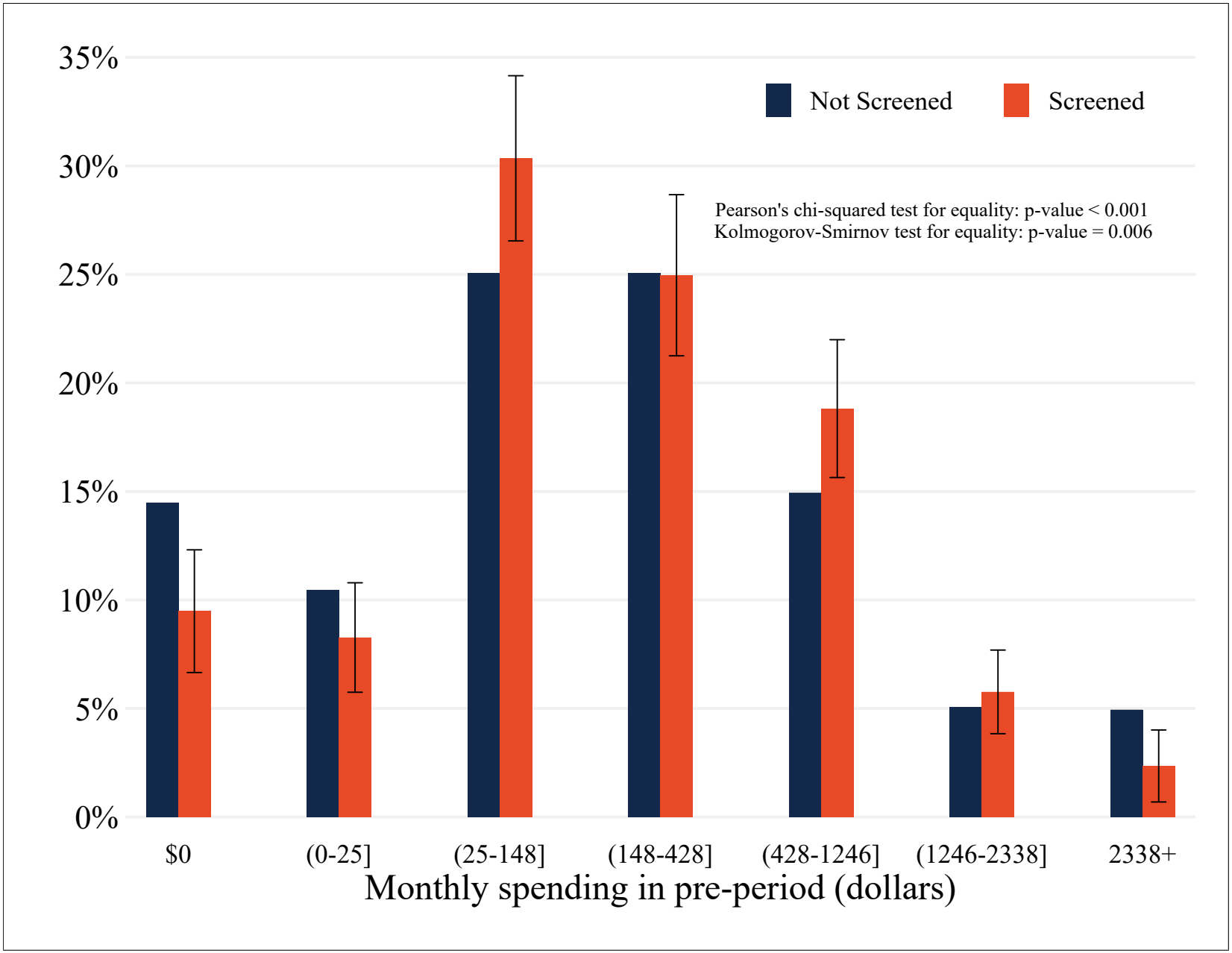


Figure 2: Employee participation rates in the iThrive workplace wellness program



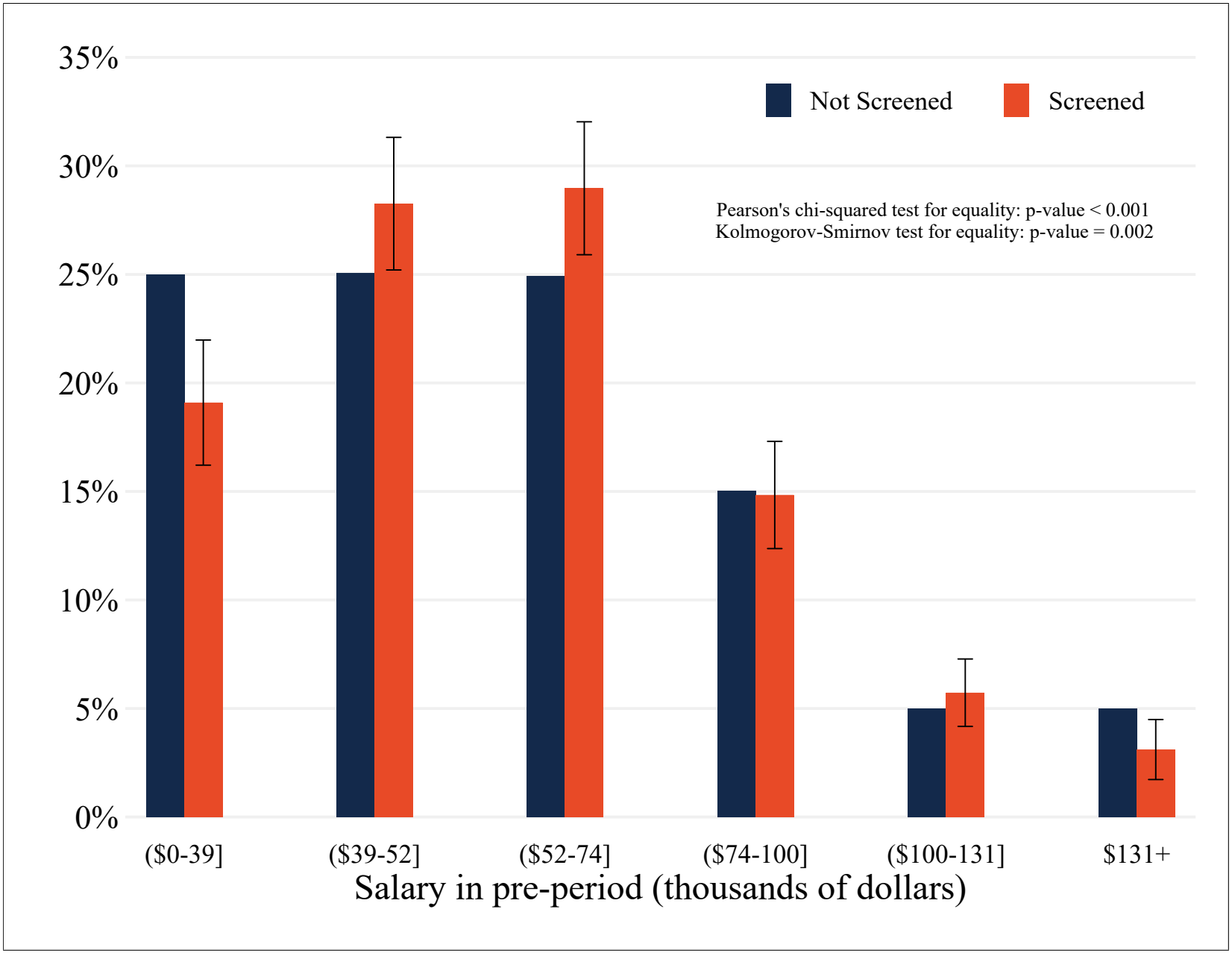
Notes: Participation rates are measured as a fraction of the treatment group ($N = 3,300$).

Figure 3: Pre-intervention medical spending among treatment group, by participation status



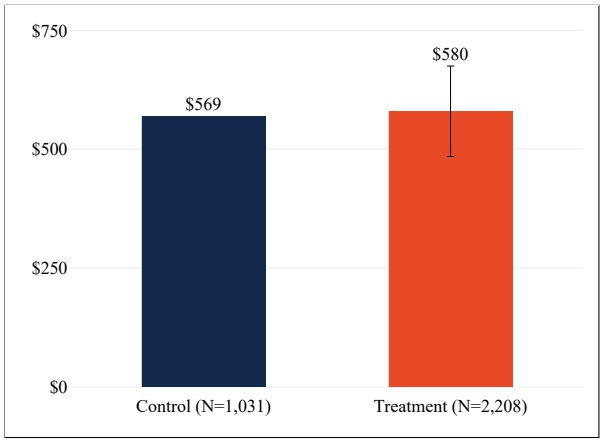
Notes: Data are from claims covering the period July 2015–July 2016 ($N = 2,188$). The first two bins ($0 and $(0 - 25]$) include 25 percent of those not screened. The remaining five bins were defined to include 25, 25, 15, 5, and 5 percent of those not screened, respectively. The null hypothesis of the Pearson's chi-squared and the non-parametric Kolmogorov-Smirnov tests is that the two samples are drawn from the same distribution.

Figure 4: Pre-intervention salary among treatment group, by participation status

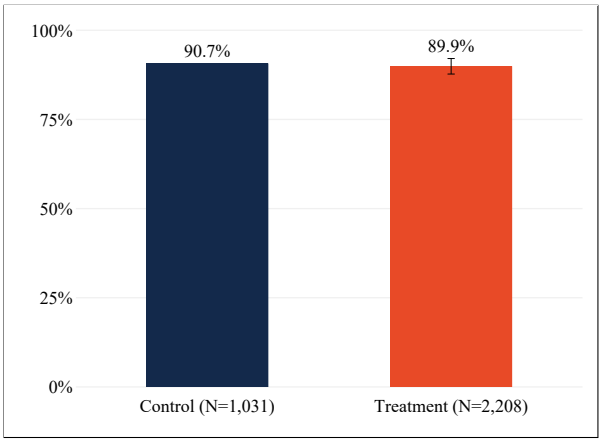


Notes: Salary was measured on June 1, 2016 ($N = 3,257$). The six bins were defined to include 25, 25, 25, 15, 5, and 5 percent of employees not screened, respectively. The null hypothesis of the Pearson's chi-squared and the non-parametric Kolmogorov-Smirnov tests is that the two samples are drawn from the same distribution.

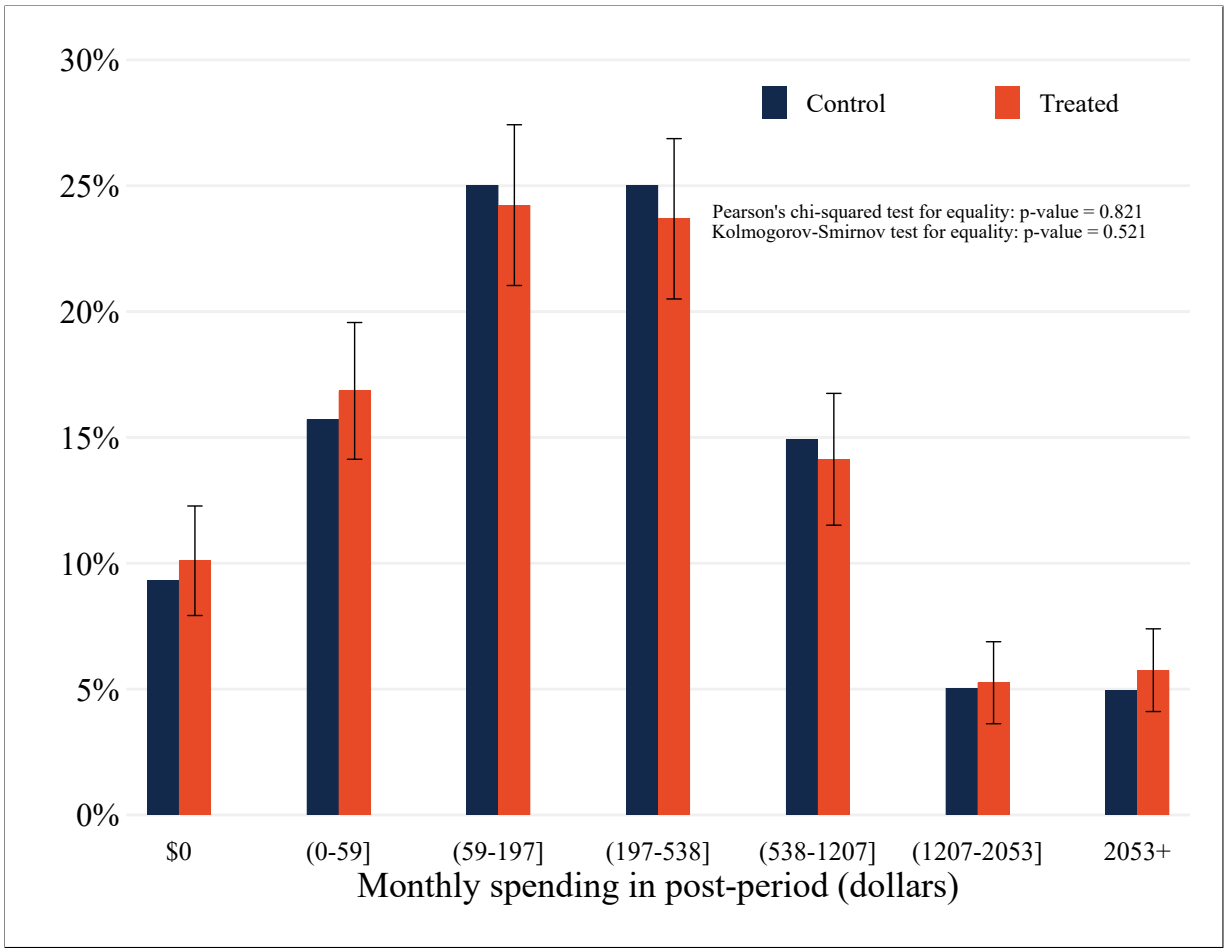
Figure 5: Post-intervention medical spending by treatment status



(a) Average monthly spending (dollars)



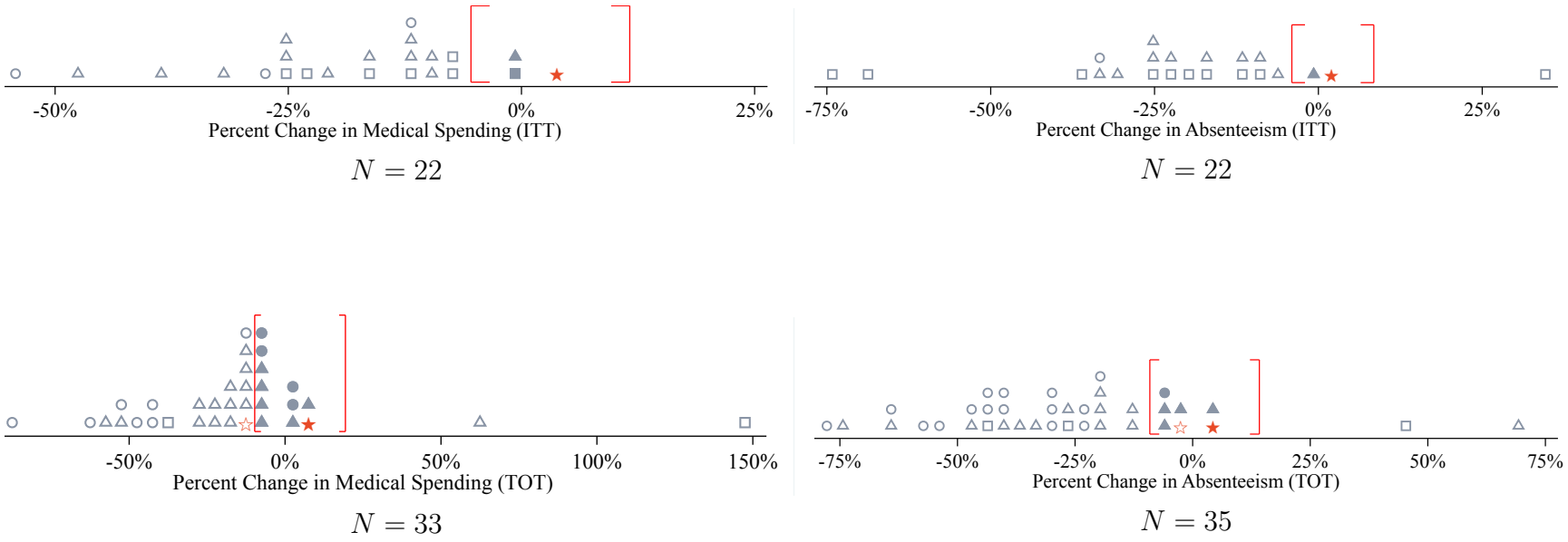
(b) Probability of any spending



(c) Histogram of average monthly spending, by quantile of control group spending ($N = 3,238$)

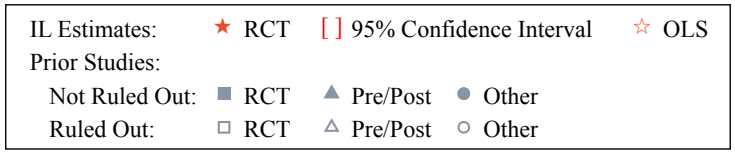
Notes: Results based on health care claims over the 12-month period August 2016–July 2017. The null hypothesis of the Pearson's chi-squared and the non-parametric Kolmogorov-Smirnov tests is that the two samples are drawn from the same distribution.

Figure 6: Comparison of experimental estimates to prior studies



(a) Medical spending estimates

(b) Absenteeism estimates



Notes: Each figure shows the distribution of N point estimates from prior workplace wellness studies. Panel (a) plots intent-to-treat (ITT) and treatment-on-the-treated (TOT) estimates for medical spending. Panel (b) plots corresponding estimates for absenteeism. The point estimates from our own study ("RCT Estimate"), and their associated confidence intervals, are taken from Column (3) of Table A.13 for medical spending, and Column (3) of Table 3 and Column (2) of Table 4 for absenteeism. Our RCT estimates and confidence intervals are plotted in order to demonstrate the share of prior study point estimates we are able to rule out. Appendix Table B.1 provides the full details of this meta-analysis.

Table 1a: Means of Study Variables at Baseline

	(1)	(2)	(3)	(4)	(5)
		Enrolled in Study			
	Not in Study	Control	Treatment	p-value	Sample size
A. Stratification Variables					
Male	0.536	0.426	0.428	0.902	12,459
Age 50+	0.430	0.323	0.327	0.818	12,459
Age 37-49	0.362	0.340	0.332	0.591	12,459
White	0.774	0.841	0.836	0.648	12,459
Salary Q1 (bottom quartile)	0.234	0.244	0.242	0.881	12,459
Salary Q2	0.189	0.255	0.259	0.773	12,459
Salary Q3	0.197	0.249	0.250	0.924	12,459
Faculty	0.298	0.196	0.201	0.721	12,459
Academic Staff	0.324	0.443	0.437	0.712	12,459
B. 2016 Survey Variables					
Ever screened		0.885	0.892	0.503	4,834
Physically active		0.359	0.382	0.134	4,834
Trying to be active		0.822	0.809	0.278	4,834
Current smoker (cigarettes)		0.072	0.065	0.428	4,833
Current smoker (other)		0.085	0.085	0.960	4,833
Former smoker		0.198	0.196	0.870	4,833
Drinker		0.657	0.645	0.423	4,830
Heavy drinker		0.050	0.049	0.955	4,829
Chronic condition		0.729	0.726	0.824	4,834
Excellent or v. good health		0.586	0.602	0.281	4,834
Not poor health		0.989	0.989	0.882	4,834
Physical problems		0.392	0.388	0.793	4,834
Lots of energy		0.310	0.330	0.171	4,834
Bad emotional health		0.308	0.288	0.162	4,834
Overweight		0.545	0.533	0.438	4,834
High BP/cholesterol/glucose		0.308	0.295	0.354	4,834
Sedentary		0.545	0.542	0.846	4,833
Pharmaceutical drug utilization		0.723	0.706	0.205	4,830
Physician/ER utilization		0.772	0.748	0.077	4,833
Hospital utilization		0.038	0.027	0.054	4,833
Any sick days in past year		0.618	0.600	0.232	4,828
Worked 50+ hours/week		0.187	0.173	0.234	4,831
Very satisfied with job		0.396	0.408	0.415	4,832
Very or somewhat satisfied with job		0.836	0.845	0.419	4,832
Management priority on health/safety		0.771	0.782	0.401	4,831
Sample size	7,625	1,534	3,300		
Joint balance test for panel A (p-value)				1.000	4,834
Joint balance test for panel B (p-value)				0.821	4,817

Notes: Columns (1)-(3) report unweighted means for different, nonoverlapping subsets of university employees. Column (4) reports the p-value from a joint test of equality of the two coefficients reported in Columns (2)-(3). The joint balance test row reports the p-value from jointly testing whether the variables in a particular panel predict enrollment into treatment.

Table 1b: Means of Study Variables at Baseline, Continued

	(1)	(2)	(3)	(4)	(5)
		Enrolled in Study			
	Not in Study	Control	Treatment	p-value	Sample size
C. Health Claims Variables (2015-2016)					
Total spending (dollars/month)	579	506	465	0.317	8,096
Office spending	54	67	58	0.498	8,096
Hospital spending	345	283	259	0.369	8,096
Drug spending	105	103	101	0.911	8,096
Non-zero medical spending	0.888	0.899	0.885	0.253	8,096
D. Health Behavior and Productivity Variables					
Sick leave (days/year)	5.89	6.05	6.13	0.707	12,459
Annual salary (dollars)	73,927	61,528	61,736	0.840	12,221
IL Marathon/10K/5K (2014-2016)	0.072	0.107	0.118	0.257	12,459
Campus gym visits (days/year)	6.14	7.36	6.78	0.483	12,459
Sample size	7,625	1,534	3,300		
Joint balance test for panel C (p-value)				0.764	3,223
Joint balance test for panel D (p-value)				0.752	4,770

Notes: Columns (1)-(3) report unweighted means for different, nonoverlapping subsets of university employees. Column (4) reports the p-value from a joint test of equality of the two coefficients reported in Columns (2)-(3). The joint balance test row reports the p-value from jointly testing whether the variables in a particular panel predict enrollment into treatment.

Table 2: Selection on Medical Spending, Productivity, and Health Behaviors

	(1)	(2)	(3)	(4)	(5)
Selection Variable	Mean	N	Completed Screening and HRA	Completed Fall Activity	Completed Spring Activity
A. Baseline Medical Spending					
Total spending (dollars/month) [admin]	479	2,188	-115.3**	-60.6	-62.5
			(52.2)	(43.6)	(44.3)
			[0.082]	[0.405]	[0.273]
Non-zero medical spending [admin]	0.885	2,188	0.050***	0.049***	0.046***
			(0.014)	(0.014)	(0.014)
			[0.008]	[0.005]	[0.020]
B. Baseline Productivity					
Productivity index [survey/admin]	0.008	3,251	-0.077	-0.099**	-0.104**
			(0.047)	(0.050)	(0.052)
			[0.096]	[0.046]	[0.044]
Sick leave (days/year) [admin]	6.274	3,296	0.473*	0.705**	0.617**
			(0.267)	(0.290)	(0.312)
			[0.144]	[0.015]	[0.048]
Worked 50+ hours/week [survey]	0.173	3,297	-0.058***	-0.065***	-0.064***
			(0.013)	(0.014)	(0.014)
			[0.000]	[0.000]	[0.000]
Annual salary (dollars) [admin]	61,736	3,257	-782.7	-3363.9***	-3429.1***
			(1248.3)	(1191.6)	(1251.8)
			[0.519]	[0.009]	[0.012]
Salary Q1 (bottom quartile) [admin]	0.242	3,300	-0.069***	-0.022	-0.036**
			(0.015)	(0.016)	(0.017)
			[0.000]	[0.398]	[0.121]
C. Baseline Health Behaviors					
IL Marathon/10K/5K (2014-2016) [admin]	0.118	3,300	0.089***	0.111***	0.090***
			(0.011)	(0.014)	(0.016)
			[0.000]	[0.000]	[0.000]
Campus gym visits (days/year) [admin]	6.780	3,300	2.178**	1.006	1.629
			(0.885)	(1.024)	(1.132)
			[0.013]	[0.328]	[0.153]

Notes: Column (1) reports the mean among subjects assigned to treatment. Columns (3)-(5) report the difference in means between those who completed the participation outcome and those who did not. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome (selection) variables in each family and are estimated using 10,000 bootstraps.

Table 3: Treatment Effects (ITT)

	(1)	(2)	(3)	(4)	(5)	(6)
	First year (12 months)			Longer-run (24-30 months)		
Outcome Variable	Mean	No Controls	Post-Lasso	Mean	No Controls	Post-Lasso
A. Medical Spending						
Total spending (dollars/month) [admin]	576.2	10.8	34.9	650.5	-74.7	-39.7
		(48.5)	(36.9)		(58.5)	(47.9)
		[0.937]	[0.859]		[0.618]	[0.754]
	N=3,239	N=3,239	N=3,152	N=3,307	N=3,307	N=3,155
Drug spending [admin]	132.0	-8.5	-6.1	148.8	-25.2	-22.2
		(26.5)	(12.0)		(27.7)	(16.4)
		[0.937]	[0.947]		[0.836]	[0.589]
	N=3,239	N=3,239	N=3,152	N=3,307	N=3,307	N=3,155
Office spending [admin]	69.5	-6.1	-2.0	74.2	-6.6	-4.8
		(10.0)	(4.4)		(8.6)	(5.4)
		[0.937]	[0.947]		[0.836]	[0.754]
	N=3,239	N=3,239	N=3,152	N=3,307	N=3,307	N=3,155
Hospital spending [admin]	313.0	22.2	24.6	353.5	-31.7	-20.3
		(30.9)	(28.1)		(35.6)	(31.9)
		[0.937]	[0.868]		[0.836]	[0.754]
	N=3,239	N=3,239	N=3,152	N=3,307	N=3,307	N=3,155
Non-zero medical spending [admin]	0.902	-0.008	0.002	0.950	0.005	0.007
		(0.011)	(0.010)		(0.008)	(0.007)
		[0.937]	[0.947]		[0.836]	[0.754]
	N=3,239	N=3,239	N=3,152	N=3,307	N=3,307	N=3,155
B. Employment and Productivity						
Job promotion [admin]	0.176	-0.003	-0.004	0.360	0.006	0.006
		(0.013)	(0.012)		(0.017)	(0.016)
		[0.952]	[0.922]		[0.996]	[0.996]
	N=4,146	N=4,146	N=4,130	N=3,635	N=3,635	N=3,619
Job terminated [admin]	0.113	-0.013	-0.012	0.204	0.002	0.002
		(0.010)	(0.009)		(0.012)	(0.012)
		[0.630]	[0.571]		[1.000]	[0.998]
	N=4,834	N=4,834	N=4,753	N=4,834	N=4,834	N=4,753
Sick leave (days/year) [admin]	6.341	0.186	0.138	6.066	0.013	0.018
		(0.230)	(0.200)		(0.204)	(0.169)
		[0.816]	[0.880]		[1.000]	[0.998]
	N=4,782	N=4,782	N=4,712	N=4,782	N=4,782	N=4,712
Management priority on health/safety [survey]	0.790	0.057***	0.050***	0.784	0.028*	0.024
		(0.015)	(0.014)		(0.016)	(0.015)
		[0.001]	[0.003]		[0.539]	[0.632]
	N=3,566	N=3,566	N=3,514	N=3,018	N=3,018	N=2,976
Productivity index [survey/admin]	0.000	-0.046	-0.060	0.000	-0.015	-0.054
		(0.061)	(0.056)		(0.062)	(0.056)
		[0.450]	[0.283]		[0.805]	[0.328]
	N=3,309	N=3,309	N=3,300	N=2,890	N=2,890	N=2,881
C. Health Status and Behaviors						
IL Marathon/10K/5K [admin]	0.066	0.002	-0.005	0.052	0.006	0.001
		(0.008)	(0.006)		(0.007)	(0.006)
		[0.975]	[0.471]		[0.625]	[0.995]
	N=4,834	N=4,834	N=4,817	N=4,834	N=4,834	N=4,817
Campus gym visits (days/year) [admin]	5.839	-0.062	0.401	5.047	-0.342	0.001
		(0.733)	(0.360)		(0.660)	(0.367)
		[0.975]	[0.471]		[0.625]	[0.998]
	N=4,834	N=4,834	N=4,817	N=4,834	N=4,834	N=4,817
Ever screened [survey]	0.942	0.039***	0.036***	0.962	0.029***	0.027***
		(0.009)	(0.008)		(0.008)	(0.007)
		[0.001]	[0.000]		[0.006]	[0.005]
	N=3,567	N=3,567	N=3,557	N=3,020	N=3,020	N=3,010

Notes: Each estimate is from a separate regression of an outcome, specified by the row, on a treatment group indicator. Observations include the control and treatment groups. Longer-run time horizons are 24 and 30 months for survey and admin outcomes, respectively. Post-Lasso specifications control for covariates selected by Lasso to predict the outcome. Potential predictors include all available baseline variables in the same family of outcomes, strata variables, and the baseline survey variables reported in Table 1a, as well as two-way interactions between these predictors. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome variables in each family. Results for all outcomes, categorized by family, are reported in Appendix Tables A.4a-A.4g (12-mo. outcomes) and Appendix Tables A.9a-A.9g (longer-run outcomes).

Table 4: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)
	Experimental (IV)		Observational (OLS)	
Outcome Variable	No Controls	Post-Lasso	No Controls	Post-Lasso
A. Medical Spending				
Total spending (dollars/month) [admin]	17.7	52.3	-137.3**	-103.8*
	(79.0)	(59.4)	(68.6)	(61.9)
	N=3,239	N=3,152	N=2,208	N=2,140
Drug spending [admin]	-13.8	-12.8	-26.3	-7.3
	(43.2)	(20.4)	(27.2)	(12.0)
	N=3,239	N=3,152	N=2,208	N=2,140
Office spending [admin]	-9.9	-3.1	12.2	8.7*
	(16.2)	(6.8)	(7.5)	(5.1)
	N=3,239	N=3,152	N=2,208	N=2,140
Hospital spending [admin]	36.1	45.2	-118.0**	-83.4
	(50.4)	(45.6)	(55.7)	(51.8)
	N=3,239	N=3,152	N=2,208	N=2,140
Non-zero medical spending [admin]	-0.013	0.004	0.061***	0.036***
	(0.018)	(0.016)	(0.014)	(0.012)
	N=3,239	N=3,152	N=2,208	N=2,140
B. Employment and Productivity				
Job promotion [admin]	-0.006	-0.009	0.019	0.009
	(0.022)	(0.021)	(0.014)	(0.015)
	N=4,146	N=4,130	N=2,840	N=2,828
Job terminated [admin]	-0.022	-0.023	-0.080***	-0.063***
	(0.018)	(0.017)	(0.011)	(0.011)
	N=4834.000	N=4753.000	N=3,300	N=3,244
Sick leave (days/year) [admin]	0.322	0.224	0.275	-0.068
	(0.398)	(0.344)	(0.272)	(0.251)
	N=4,782	N=4,712	N=3,264	N=3,216
Management priority on health/safety [survey]	0.087***	0.077***	-0.004	-0.007
	(0.023)	(0.021)	(0.017)	(0.016)
	N=3,566	N=3,514	N=2,410	N=2,376
Productivity index [survey/admin]	-0.070	-0.096	0.069	0.083
	(0.092)	(0.085)	(0.073)	(0.067)
	N=3,309	N=3,300	N=2,245	N=2,240
C. Health Status and Behaviors				
IL Marathon/10K/5K 2017 [admin]	0.003	-0.011	0.059***	0.024***
	(0.014)	(0.011)	(0.008)	(0.006)
	N=4834.000	N=4,817	N=3,300	N=3,287
Campus gym visits (days/year) [admin]	-0.110	0.757	3.527***	2.160***
	(1.309)	(0.656)	(0.813)	(0.425)
	N=4834.000	N=4,817	N=3,300	N=3,287
Ever screened [survey]	0.060***	0.056***	0.073***	0.061***
	(0.014)	(0.012)	(0.011)	(0.009)
	N=3,567	N=3,557	N=2,410	N=2,404

Notes: Each row and column reports estimates from a separate regression. The outcome in each regression is specified by the table row, and the (endogenous) focal independent variable is an indicator for completing the screening and HRA. For the IV specifications (columns (1)-(3)), the instrument is an indicator for inclusion in the treatment group, and observations include individuals in the control or treatment groups. For the OLS specifications (columns (4)-(6)), there is no instrument and observations are restricted to individuals in the treatment group. The control strategy is specified by the column. Post-Lasso controls include covariates selected by Lasso to predict either the dependent variable or the focal independent variable. The set of potential predictors include baseline values of all available variables in the same family of outcomes, strata variables, and the baseline (2016) survey variables reported in Table 1a, as well as all two-way interactions between these predictors. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Online Appendix

What Do Workplace Wellness Programs Do?
Evidence from the Illinois Workplace Wellness Study

Damon Jones, University of Chicago and NBER
David Molitor, University of Illinois and NBER
Julian Reif, University of Illinois and NBER

July 2019

The most recent version of Appendix C is available on the study website:
www.nber.org/workplacewellness/s/wyoung.pdf

Appendix A: Additional Figures and Tables

Appendix Figure A.1 plots our intent-to-treat estimate for medical spending as a function of the degree of winsorization (top-coding). (Winsorization is employed only in Section 4.3.2, where we compare our estimates with the prior literature.) The point estimate is stable across a wide range of winsorization levels, suggesting that winsorization does not introduce bias.

Appendix Tables A.1a and A.1b provide summary statistics at baseline for the employees in our sample. Columns (2)-(8) report means for those who were assigned to our control and treatment groups. Column (1) reports means for employees not enrolled in our study. To evaluate balance, we regress the study variable reported in each row on seven indicators, one for the control and each of six treatment groups, and test for the joint equality of the seven coefficients. Column (9) reports the p-value from that test. We also estimate a seemingly unrelated regression model to test whether the variables listed within each panel predict enrollment into either the control or any of the six treatment groups. The bottom of Tables 1a and 1b reports the p-value from jointly testing whether all regression coefficients across all seven groups are equal to 0, within each panel.

Appendix Tables A.3a–A.3d provide selection results for the full set of pre-specified variables shown in Tables 1a and 1b using equation (1). Appendix Tables A.4a–A.4g report the causal, intent-to-treat (ITT) effect of our intervention on all pre-specified variables. Appendix Tables A.5a–A.5h provide the corresponding IV and OLS estimates of equation (3) for all pre-specified variables.

Appendix Tables A.6a and A.6b report intent-to-treat estimates for medical spending from a model that allows the treatment effect to vary by treatment group. We do not find statistically significant treatment effects for any treatment group in any of these specifications.

As discussed in Section 4.3.1, we find two statistically significant effects of our intervention: an increase in the number of employees who ever received a health screening, and an increase in employees who believe that management places a priority on health and safety. Because our monetary incentives were varied independently across the health screening and wellness activity components of our study, these incentives can be used as instruments for participation in those components. Appendix Table A.7 reports estimates of those IV regressions. For both outcomes, the effects are driven by the health screening component of our intervention.

Appendix Table A.8 reports ITT and IV estimates of winsorized 12-month medical spending, for both "no control" and post-Lasso specifications.

Appendix Tables A.9a-A.9g report the causal, intent-to-treat (ITT) effect of our intervention on longer-run versions of all pre-specified variables. The time horizon of each longer-run outcome ranges from 24–30 months, as reported in column (1) of the table.

Appendix Table A.10 reports the loadings of the first principal component of productivity.

Appendix Table A.11 presents the results of a cross-validation exercise that compares each of our administrative measures of employment and productivity to each of our survey measures of work and productivity. We find a strong degree of concordance between the independently-measured administrative and survey variables. The eighth row of column (3) reports that individuals who self-report receiving "a promotion or more responsibility at

work" are 22.5 percent more likely to have an official title change in our administrative data, and column (2) reports that they are 22.9 percent more likely to have received a promotion, which we define as having both a job title change *and* a non-zero salary raise.

Appendix Table A.12 reports results of tests for differential attrition between the control and treatment groups. We perform these tests separately for our three main sources of data: health insurance claims, university administrative data, and online surveys. The fractions of control and treatment subjects included in the health insurance and university administrative datasets are very similar. The control group's survey completion rate is slightly higher than the treatment group's completion rate in both 2017 and 2018.

In Appendix Figure A.2 and Appendix Table A.15 we apply the method of Andrews and Kasy (Forthcoming) to explore the possibility of publication bias among prior wellness studies. We draw on the 40 studies for which we could identify an effect and standard error. Appendix Figure A.2a plots the distribution of z-statistics among these studies, with a red vertical line indicating a z-statistic of -1.96. Appendix Figure A.2b plots the effect estimates from these studies against their standard errors, with a diagonal lines separating studies by significance at the 5 percent level. Visually, there appears to be a higher frequency of studies with z-statistics near -1.96.

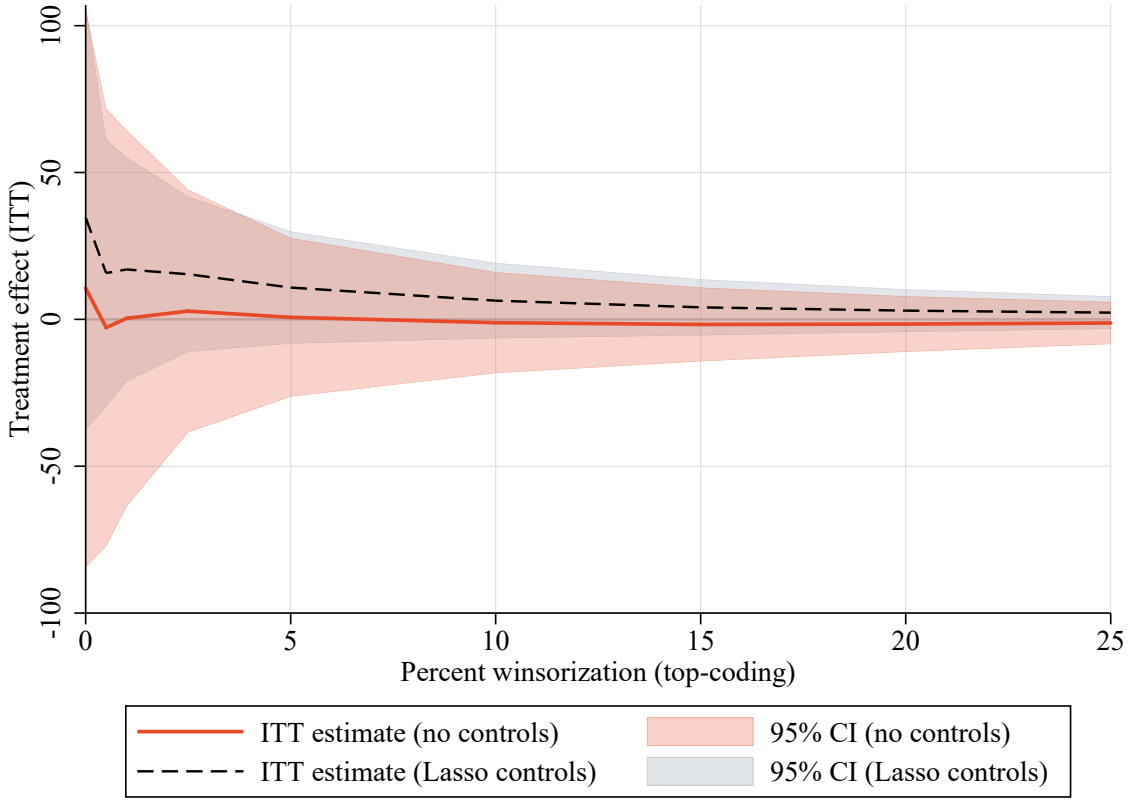
Using an online app published by one of the authors, Maximilian Kasy (https://maxkasy.github.io/home/metastudy/), we estimate the following model of the true distribution of estimates and publication probability conditional on z-score:

$$\mu \sim \bar{\theta} + t(\nu) \cdot \tilde{\tau}, \quad p(Z) \propto \begin{cases} \beta_{1,p} & |Z| < 1.96 \\ 1 & |Z| \geq 1.96 \end{cases} \tag{A.1}$$

The key parameter, $\beta_{1,p}$, represents the probability of publication for studies that have a z-statistic with absolute value less than 1.96, relative to those studies that have a z-statistic with absolute value greater than 1.96. A value of $\beta_{1,p} = 1$ would indicate that effects have an equal likelihood of being published, whether they are statistically significant or not. The estimate we find of 0.37 suggests that effects that are insignificant are published a little more than one-third the rate of significant ones. Our estimates for position ($\bar{\theta}$), scale ($\tilde{\tau}$), and degrees of freedom (ν) parameters for this distribution, along with the relative publication probability, are reported in Appendix Table A.15. The bias-corrected mean estimate is not significantly different from zero ($p = 0.14$) and the relative publication probability of insignificant studies is 0.37. See Andrews and Kasy (Forthcoming) for more details on the method.

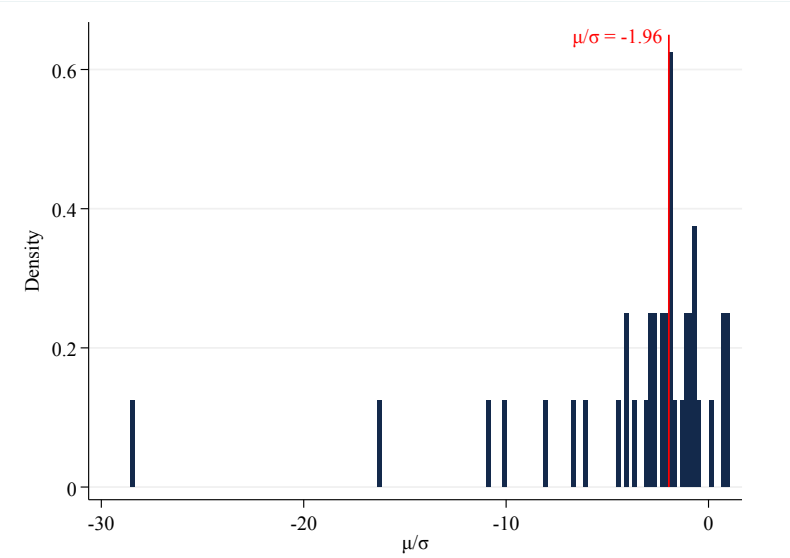
Finally, Appendix Table A.16 provides the definition, data source, and time period for every variable presented in the paper.

Figure A.1: First-Year Winsorized Medical Spending estimates

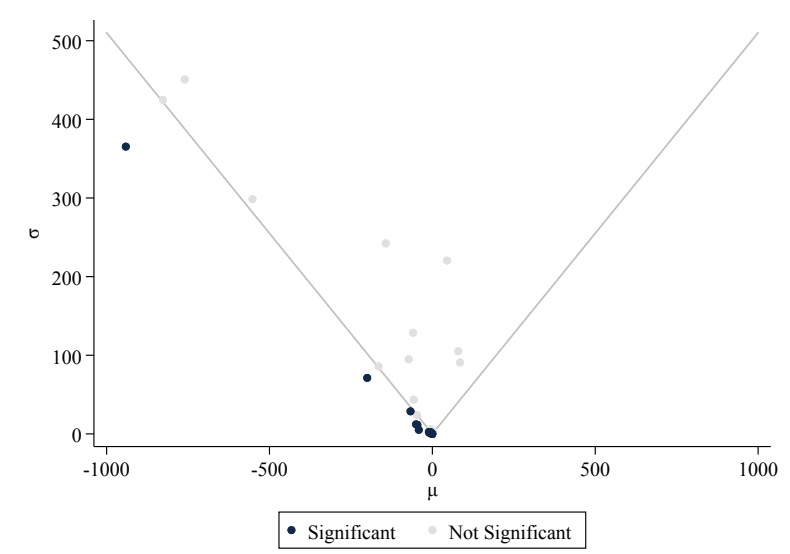


Notes: The figure reports how intent-to-treat (ITT) medical spending effect estimates vary by the degree of winsorization (top-coding) of medical spending, calculated as the average monthly health care spending over the first 12 months of the wellness program (August 2016–July 2017). Each ITT estimate is estimated from a separate regression of medical spending (winsorized at the level indicated by the horizontal axis) on an indicator for inclusion in the treatment group. Observations include individuals in the control or treatment groups, and regressions are weighted by the number of months of medical coverage. The solid orange line reports estimates from a specification that includes no controls. The dashed black line reports estimates from a specification that includes the same controls as the ITT post-Lasso specification reported in row 1 and column (3) of Table 3. Shaded regions indicate 95% confidence intervals based on robust standard errors. The values of the ITT point estimates and confidence intervals for selected levels of winsorization are reported in Panel A (no controls) and Panel B (post-Lasso controls) of Table A.8.

Figure A.2: Meta-Analysis of Publication Bias



(a) Density of z-statistics: μ/σ



(b) Estimates versus standard error

Notes: Following Andrews and Kasy (Forthcoming), we plot in Panel (a) a binned density plot of z-statistics from 40 studies in the prior literature. The vertical red line represents a z-statistic of -1.96. Panel (b) plots each point estimate, μ, against its standard error, σ. The grey lines mark $|\mu|/\sigma = 1.96$.

Table A.1a: Means of Study Variables at Baseline For All Study Arms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Enrolled in Study								
	Not in Study	Control	A25	A75	B25	B75	C25	C75	p-value	Sample size
A. Stratification Variables										
Male	0.536	0.426	0.423	0.434	0.429	0.427	0.421	0.432	1.000	12,459
Age 50+	0.430	0.323	0.332	0.322	0.326	0.325	0.328	0.326	1.000	12,459
Age 37-49	0.362	0.340	0.330	0.333	0.330	0.336	0.330	0.335	0.999	12,459
White	0.774	0.841	0.828	0.847	0.835	0.832	0.842	0.831	0.971	12,459
Salary Q1 (bottom quartile)	0.234	0.244	0.243	0.239	0.246	0.237	0.241	0.244	1.000	12,459
Salary Q2	0.189	0.255	0.254	0.259	0.255	0.261	0.258	0.266	0.999	12,459
Salary Q3	0.197	0.249	0.252	0.260	0.250	0.248	0.250	0.240	0.996	12,459
Faculty	0.298	0.196	0.198	0.202	0.199	0.203	0.198	0.204	1.000	12,459
Academic Staff	0.324	0.443	0.439	0.439	0.438	0.434	0.436	0.435	1.000	12,459
B. 2016 Survey Variables										
Ever screened		0.885	0.895	0.900	0.891	0.876	0.887	0.902	0.817	4,834
Physically active		0.359	0.350	0.397	0.399	0.392	0.370	0.381	0.387	4,834
Trying to be active		0.822	0.799	0.791	0.799	0.843	0.797	0.827	0.161	4,834
Current smoker (cigarettes)		0.072	0.051	0.060	0.062	0.075	0.071	0.075	0.513	4,833
Current smoker (other)		0.085	0.075	0.062	0.089	0.089	0.096	0.100	0.224	4,833
Former smoker		0.198	0.216	0.186	0.185	0.204	0.211	0.171	0.481	4,833
Drinker		0.657	0.641	0.658	0.636	0.625	0.656	0.656	0.836	4,830
Heavy drinker		0.050	0.051	0.035	0.054	0.044	0.056	0.055	0.553	4,829
Chronic condition		0.729	0.751	0.729	0.712	0.741	0.701	0.721	0.562	4,834
Excellent or v. good health		0.586	0.613	0.619	0.612	0.604	0.563	0.603	0.433	4,834
Not poor health		0.989	0.982	0.991	0.993	0.987	0.995	0.989	0.509	4,834
Physical problems		0.392	0.387	0.395	0.380	0.392	0.401	0.375	0.979	4,834
Lots of energy		0.310	0.339	0.324	0.346	0.327	0.323	0.321	0.790	4,834
Bad emotional health		0.308	0.247	0.326	0.292	0.288	0.279	0.299	0.078	4,834
Overweight		0.545	0.577	0.530	0.507	0.518	0.552	0.514	0.202	4,834
High BP/cholesterol/glucose		0.308	0.328	0.281	0.292	0.266	0.290	0.313	0.273	4,834
Sedentary		0.545	0.569	0.499	0.538	0.571	0.530	0.545	0.239	4,833
Pharmaceutical drug utilization		0.723	0.736	0.710	0.710	0.670	0.708	0.701	0.286	4,830
Physician/ER utilization		0.772	0.797	0.734	0.774	0.712	0.715	0.760	0.003	4,833
Hospital utilization		0.038	0.036	0.020	0.024	0.022	0.034	0.026	0.168	4,833
Any sick days in past year		0.618	0.628	0.622	0.580	0.607	0.583	0.581	0.325	4,828
Worked 50+ hours/week		0.187	0.162	0.168	0.192	0.175	0.176	0.164	0.711	4,831
Very satisfied with job		0.396	0.385	0.426	0.408	0.389	0.435	0.408	0.534	4,832
Very or somewhat satisfied with job		0.836	0.858	0.829	0.841	0.847	0.842	0.852	0.818	4,832
Management priority on health/safety		0.771	0.797	0.780	0.746	0.781	0.791	0.796	0.399	4,831
Sample size	7,625	1,534	551	549	552	548	551	549		
Joint balance test for panel A (p-value)									1.000	4,834
Joint balance test for panel B (p-value)									0.165	4,817

Notes: Columns (1)-(8) report unweighted means for different, nonoverlapping subsets of university employees. Column (9) reports the p-value from a joint test of equality of the seven coefficients reported in Columns (2)-(8). We also estimate a seemingly unrelated regression model to test whether the variables listed in a particular panel predict enrollment into any of the seven control or treatment groups. The joint balance test row reports the p-value from jointly testing whether all regression coefficients across all seven study groups are equal to 0.

Table A.1b: Means of Study Variables at Baseline For All Study Arms, Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Enrolled in Study								
	Not in Study	Control	A25	A75	B25	B75	C25	C75	*p*-value	Sample size
C. Health Claims Variables (2015-2016)										
Total spending (dollars/month)	579	506	452	393	486	458	500	494	0.571	8,096
Office spending	54	67	61	53	54	49	79	50	0.332	8,096
Hospital spending	345	283	242	231	281	239	263	300	0.707	8,096
Drug spending	105	103	97	75	113	124	94	103	0.842	8,096
Non-zero medical spending	0.888	0.899	0.911	0.886	0.901	0.862	0.867	0.886	0.282	8,096
D. Health Behavior and Productivity Variables										
Sick leave (days/year)	5.89	6.05	6.53	5.82	5.69	6.36	6.24	6.13	0.394	12,459
Annual salary (dollars)	73,927	61,528	62,774	60,579	60,906	62,719	61,042	62,407	0.875	12,221
IL Marathon/10K/5K (2014-2016)	0.072	0.107	0.120	0.120	0.118	0.111	0.102	0.137	0.597	12,459
Campus gym visits (days/year)	6.14	7.36	5.44	8.68	7.68	5.69	5.34	7.86	0.119	12,459
Sample size	7,625	1,534	551	549	552	548	551	549		
Joint balance test for panel C (*p*-value)									0.207	3,223
Joint balance test for panel D (*p*-value)									0.438	4,770

Notes: Columns (1)-(8) report unweighted means for different, nonoverlapping subsets of university employees. Column (9) reports the *p*-value from a joint test of equality of the seven coefficients reported in Columns (2)-(8). We also estimate a seemingly unrelated regression model to test whether the variables listed in a particular panel predict enrollment into any of the seven control or treatment groups. The joint balance test row reports the *p*-value from jointly testing whether all regression coefficients across all seven study groups are equal to 0.

Table A.2: Wellness Program Participation Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Screening		HRA		Fall Activity		Spring Activity	
	No Controls	Strata FEs	No Controls	Strata FEs	No Controls	Strata FEs	No Controls	Strata FEs
A. Year 1 participation								
Treated	0.576***	0.576***	0.560***	0.560***	0.274***	0.274***	0.224***	0.225***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.007)	(0.007)
Constant	0.000	-0.000	0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.002)	(0.000)	(0.002)	(.)	(0.002)	(.)	(0.002)
N	4,834	4,834	4,834	4,834	4,834	4,834	4,834	4,834
F	4476.7	4397.8	4198.3	4121.7	1242.7	1220.0	953.5	935.0
F-test (p-value)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
B. Year 2 participation								
Treated	0.041***	0.042***	0.385***	0.386***	0.133***	0.134***	0.104***	0.104***
	(0.015)	(0.015)	(0.008)	(0.009)	(0.006)	(0.006)	(0.005)	(0.005)
Constant	0.387***	0.386***	0.000	-0.001	0.000	-0.001	0.000	-0.000
	(0.012)	(0.012)	(.)	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)
N	4,834	4,834	4,834	4,834	4,834	4,834	4,834	4,834
F	7.3	7.7	2069.0	2031.8	506.2	497.1	381.4	374.9
F-test (p-value)	0.007	0.005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Notes: This table reports treatment effects on completing components of the iThrive workplace wellness program tied to completion incentives. Only members of the treatment group were eligible to complete each component (i.e. control group participation is zero), except both groups were eligible for a follow-up screening in year 2. Each column in each panel reports estimates from a separate regression estimated over individuals in the treatment and control groups. The outcome in each regression is an indicator for completing the program component indicated by the column, and the primary independent variable is an indicator for inclusion in the treatment group. Participation effects for each outcome are estimated with and without baseline strata fixed effects. Robust standard errors are reported in parentheses. Missing standard errors are reported when the estimated variance is negative. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.3a: Selection on Strata Variables

	(1)	(2)	(3)	(4)	(5)
Selection Variable	Mean	N	Completed Screening and HRA	Completed Fall Activity	Completed Spring Activity
Male [admin]	0.428	3,300	-0.058***	-0.114***	-0.149***
			(0.017)	(0.019)	(0.020)
			[0.005]	[0.000]	[0.000]
Age 50+ [admin]	0.327	3,300	-0.027	-0.015	-0.020
			(0.016)	(0.018)	(0.019)
			[0.270]	[0.399]	[0.473]
Age 37-49 [admin]	0.332	3,300	0.008	0.026	0.017
			(0.017)	(0.019)	(0.020)
			[0.850]	[0.398]	[0.473]
White [admin]	0.836	3,300	-0.001	0.046***	0.036**
			(0.013)	(0.014)	(0.015)
			[0.962]	[0.005]	[0.072]
Salary Q1 (bottom quartile) [admin]	0.242	3,300	-0.069***	-0.022	-0.036**
			(0.015)	(0.016)	(0.017)
			[0.000]	[0.398]	[0.121]
Salary Q2 [admin]	0.259	3,300	0.038**	0.028	0.058***
			(0.015)	(0.017)	(0.019)
			[0.052]	[0.346]	[0.012]
Salary Q3 [admin]	0.250	3,300	0.044***	0.043**	0.040**
			(0.015)	(0.017)	(0.019)
			[0.019]	[0.067]	[0.121]
Faculty [admin]	0.201	3,300	-0.051***	-0.098***	-0.097***
			(0.014)	(0.014)	(0.015)
			[0.002]	[0.000]	[0.000]
Academic Staff [admin]	0.437	3,300	0.077***	0.077***	0.086***
			(0.017)	(0.019)	(0.021)
			[0.000]	[0.001]	[0.000]

Notes: Column (1) reports the mean among subjects assigned to treatment. Columns (3)-(5) report the difference in means between those who completed the participation outcome and those who did not. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome (selection) variables in each family and are estimated using 10,000 bootstraps.

Table A.3b: Selection on Health Care Utilization Variables

	(1)	(2)	(3)	(4)	(5)
Selection Variable	Mean	N	Completed Screening and HRA	Completed Fall Activity	Completed Spring Activity
Total spending (dollars/month) [admin]	479	2,188	-115.3**	-60.6	-62.5
			(52.2)	(43.6)	(44.3)
			[0.082]	[0.405]	[0.273]
Office spending [admin]	59	2,188	2.4	-5.6	-12.4**
			(7.2)	(6.5)	(6.2)
			[0.739]	[0.638]	[0.145]
Hospital spending [admin]	268	2,188	-103.7**	-47.3*	-62.8**
			(40.3)	(28.3)	(27.5)
			[0.046]	[0.297]	[0.104]
Drug spending [admin]	104	2,188	-14.7	-4.3	14.5
			(20.6)	(25.5)	(28.9)
			[0.732]	[0.872]	[0.635]
Non-zero medical spending [admin]	0.885	2,188	0.050***	0.049***	0.046***
			(0.014)	(0.014)	(0.014)
			[0.008]	[0.005]	[0.020]
Pharmaceutical drug utilization [survey]	0.706	3,297	-0.001	0.029*	0.040**
			(0.016)	(0.018)	(0.019)
			[0.929]	[0.183]	[0.059]
Physician/ER utilization [survey]	0.748	3,300	0.050***	0.070***	0.061***
			(0.015)	(0.016)	(0.017)
			[0.003]	[0.000]	[0.002]
Hospital utilization [survey]	0.027	3,299	-0.012**	-0.005	-0.012**
			(0.006)	(0.006)	(0.006)
			[0.072]	[0.400]	[0.059]

Notes: Column (1) reports the mean among subjects assigned to treatment. Columns (3)-(5) report the difference in means between those who completed the participation outcome and those who did not. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome (selection) variables in each family and are estimated using 10,000 bootstraps.

Table A.3c: Selection on Employment and Productivity Variables

	(1)	(2)	(3)	(4)	(5)
Selection Variable	Mean	N	Completed Screening and HRA	Completed Fall Activity	Completed Spring Activity
Sick leave (days/year) [admin]	6.274	3,296	0.473*	0.705**	0.617**
			(0.267)	(0.290)	(0.312)
			[0.144]	[0.015]	[0.048]
Annual salary (dollars) [admin]	61,736	3,257	-782.7	-3363.9***	-3429.1***
			(1248.3)	(1191.6)	(1251.8)
			[0.519]	[0.009]	[0.012]
Any sick days in past year [survey]	0.600	3,296	0.043**	0.057***	0.051**
			(0.017)	(0.019)	(0.020)
			[0.049]	[0.008]	[0.046]
Worked 50+ hours/week [survey]	0.173	3,297	-0.058***	-0.065***	-0.064***
			(0.013)	(0.014)	(0.014)
			[0.000]	[0.000]	[0.000]
Very satisfied with job [survey]	0.408	3,299	0.002	0.002	0.002
			(0.017)	(0.019)	(0.021)
			[0.899]	[0.921]	[0.911]
Very or somewhat satisfied with job [survey]	0.845	3,299	0.023*	0.043***	0.029**
			(0.013)	(0.013)	(0.014)
			[0.193]	[0.005]	[0.092]
Management priority on health/safety [survey]	0.782	3,299	0.012	0.033**	0.035**
			(0.015)	(0.016)	(0.017)
			[0.618]	[0.062]	[0.092]
Productivity index [survey/admin]	0.008	3,251	-0.077	-0.099**	-0.104**
			(0.047)	(0.050)	(0.052)
			[0.096]	[0.046]	[0.044]

Notes: Column (1) reports the mean among subjects assigned to treatment. Columns (3)-(5) report the difference in means between those who completed the participation outcome and those who did not. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome (selection) variables in each family and are estimated using 10,000 bootstraps.

Table A.3d: Selection on Health and Behavior Variables

	(1)	(2)	(3)	(4)	(5)
Selection Variable	Mean	*N*	Completed Screening and HRA	Completed Fall Activity	Completed Spring Activity
IL Marathon/10K/5K (2014-2016) [admin]	0.118	3,300	0.089***	0.111***	0.090***
			(0.011)	(0.014)	(0.016)
			[0.000]	[0.000]	[0.000]
Campus gym visits (days/year) [admin]	6.780	3,300	2.178**	1.006	1.629
			(0.885)	(1.024)	(1.132)
			[0.013]	[0.328]	[0.153]
Ever screened [survey]	0.892	3,300	0.033***	0.042***	0.035***
			(0.011)	(0.011)	(0.012)
			[0.029]	[0.002]	[0.046]
Physically active [survey]	0.382	3,300	-0.015	0.013	0.040*
			(0.017)	(0.019)	(0.020)
			[0.909]	[0.964]	[0.445]
Trying to be active [survey]	0.809	3,300	0.045***	0.033**	0.030*
			(0.014)	(0.015)	(0.016)
			[0.014]	[0.293]	[0.445]
Current smoker (cigarettes) [survey]	0.065	3,299	-0.041***	-0.047***	-0.053***
			(0.009)	(0.008)	(0.008)
			[0.000]	[0.000]	[0.000]
Current smoker (other) [survey]	0.085	3,299	-0.034***	-0.046***	-0.066***
			(0.010)	(0.010)	(0.009)
			[0.011]	[0.000]	[0.000]
Former smoker [survey]	0.196	3,299	-0.009	-0.004	-0.019
			(0.014)	(0.015)	(0.016)
			[0.909]	[0.964]	[0.770]
Drinker [survey]	0.645	3,296	0.026	0.021	0.009
			(0.017)	(0.019)	(0.020)
			[0.707]	[0.889]	[0.929]
Heavy drinker [survey]	0.049	3,295	-0.010	-0.005	-0.006
			(0.008)	(0.008)	(0.009)
			[0.798]	[0.964]	[0.929]
Chronic condition [survey]	0.726	3,300	0.024	0.038**	0.023
			(0.016)	(0.017)	(0.018)
			[0.707]	[0.293]	[0.770]
Excellent or v. good health [survey]	0.602	3,300	-0.022	0.032*	0.060***
			(0.017)	(0.019)	(0.020)
			[0.798]	[0.626]	[0.045]
Not poor health [survey]	0.989	3,300	0.003	0.005	0.007*
			(0.004)	(0.004)	(0.003)
			[0.909]	[0.703]	[0.445]
Physical problems [survey]	0.388	3,300	0.022	-0.015	-0.027
			(0.017)	(0.019)	(0.020)
			[0.798]	[0.964]	[0.750]
Lots of energy [survey]	0.330	3,300	-0.031*	0.006	0.014
			(0.017)	(0.018)	(0.020)
			[0.502]	[0.964]	[0.929]
Bad emotional health [survey]	0.288	3,300	0.001	-0.019	-0.041**
			(0.016)	(0.018)	(0.018)
			[0.944]	[0.889]	[0.280]
Overweight [survey]	0.533	3,300	0.057***	0.015	-0.008
			(0.017)	(0.019)	(0.021)
			[0.015]	[0.964]	[0.929]
High BP/cholesterol/glucose [survey]	0.295	3,300	-0.007	-0.022	-0.034*
			(0.016)	(0.018)	(0.019)
			[0.909]	[0.866]	[0.445]
Sedentary [survey]	0.542	3,299	0.117***	0.115***	0.110***
			(0.017)	(0.019)	(0.020)
			[0.000]	[0.000]	[0.000]

Notes: Column (1) reports the mean among subjects assigned to treatment. Columns (3)-(5) report the difference in means between those who completed the participation outcome and those who did not. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome (selection) variables in each family and are estimated using 10,000 bootstraps.

Table A.4a: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
A. Medical Spending [admin]				
Total spending (dollars/month) [admin]	576.2	10.8	21.0	34.9
		(48.5)	(48.7)	(36.9)
		[0.937]	[0.927]	[0.859]
	N=3,239	N=3,239	N=3,239	N=3,152
Drug spending [admin]	132.0	-8.5	-5.4	-6.1
		(26.5)	(25.7)	(12.0)
		[0.937]	[0.927]	[0.947]
	N=3,239	N=3,239	N=3,239	N=3,152
Office spending [admin]	69.5	-6.1	-5.7	-2.0
		(10.0)	(9.8)	(4.4)
		[0.937]	[0.927]	[0.947]
	N=3,239	N=3,239	N=3,239	N=3,152
Hospital spending [admin]	313.0	22.2	28.9	24.6
		(30.9)	(32.2)	(28.1)
		[0.937]	[0.861]	[0.868]
	N=3,239	N=3,239	N=3,239	N=3,152
Non-zero medical spending [admin]	0.902	-0.008	-0.007	0.002
		(0.011)	(0.011)	(0.010)
		[0.937]	[0.927]	[0.947]
	N=3,239	N=3,239	N=3,239	N=3,152

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. Each row and column reports estimates from a separate regression, where observations include individuals in the control or treatment groups. The outcome in each regression is specified by the table row. The focal independent variable is an indicator for inclusion in the treatment group, and the control strategy is specified by the column. Post-Lasso controls include covariates selected by Lasso to predict the dependent variable. The set of potential predictors include baseline values of all available variables in the same family of outcomes, strata variables, and the baseline (2016) survey variables reported in Table 1a, as well as all two-way interactions between these predictors. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome variables in the table.

Table A.4b: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
A. Medical Spending [survey]				
Pharmaceutical drug utilization [survey]	0.725	-0.011	-0.009	-0.002
		(0.016)	(0.015)	(0.014)
		[0.851]	[0.864]	[0.895]
	N=3,567	N=3,567	N=3,567	N=2,433
Physician/ER utilization [survey]	0.745	0.003	0.002	0.018
		(0.016)	(0.015)	(0.017)
		[0.863]	[0.919]	[0.632]
	N=3,567	N=3,567	N=3,567	N=2,433
Hospital utilization [survey]	0.026	0.003	0.004	0.006
		(0.006)	(0.006)	(0.007)
		[0.851]	[0.864]	[0.632]
	N=3,567	N=3,567	N=3,567	N=2,433

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.4a for additional details.

Table A.4c: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
B. Employment and Productivity [admin]				
Annual salary (share of baseline salary) [admin]	0.059	-0.000	-0.002	-0.001
		(0.005)	(0.005)	(0.004)
		[0.969]	[0.875]	[0.922]
	N=4,146	N=4,146	N=4,146	N=4,130
Job promotion [admin]	0.176	-0.003	-0.006	-0.004
		(0.013)	(0.013)	(0.012)
		[0.952]	[0.875]	[0.922]
	N=4,146	N=4,146	N=4,146	N=4,130
Job title change [admin]	0.184	-0.006	-0.009	-0.008
		(0.013)	(0.013)	(0.013)
		[0.882]	[0.753]	[0.880]
	N=4,146	N=4,146	N=4,146	N=4,130
Job terminated [admin]	0.113	-0.013	-0.014	-0.012
		(0.010)	(0.010)	(0.009)
		[0.630]	[0.509]	[0.571]
	N=4,834	N=4,834	N=4,834	N=4,753
Sick leave (days/year) [admin]	6.341	0.186	0.249	0.138
		(0.230)	(0.208)	(0.200)
		[0.816]	[0.563]	[0.880]
	N=4,782	N=4,782	N=4,782	N=4,712

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.4a for additional details.

Table A.4d: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
B. Employment and Productivity [survey]				
Any sick days in past year [survey]	0.576	0.005	0.007	0.012
		(0.018)	(0.017)	(0.016)
		[0.997]	[0.994]	[0.961]
	N=3,565	N=3,565	N=3,565	N=3,514
Worked 50+ hours/week [survey]	0.150	-0.004	-0.008	0.005
		(0.013)	(0.012)	(0.010)
		[0.997]	[0.991]	[0.961]
	N=3,566	N=3,566	N=3,566	N=3,515
Very satisfied with job [survey]	0.387	-0.025	-0.028	-0.029*
		(0.017)	(0.017)	(0.015)
		[0.749]	[0.631]	[0.376]
	N=3,564	N=3,564	N=3,564	N=3,512
Very or somewhat satisfied with job [survey]	0.835	-0.004	-0.006	-0.013
		(0.013)	(0.013)	(0.012)
		[0.997]	[0.994]	[0.882]
	N=3,564	N=3,564	N=3,564	N=3,512
Management priority on health/safety [survey]	0.790	0.057***	0.057***	0.050***
		(0.015)	(0.015)	(0.014)
		[0.001]	[0.001]	[0.003]
	N=3,566	N=3,566	N=3,566	N=3,514
Happier at work than last year [survey]	0.542	0.009	0.005	-0.003
		(0.018)	(0.018)	(0.018)
		[0.995]	[0.994]	[0.978]
	N=3,562	N=3,562	N=3,562	N=3,510
Presenteeism [survey]	23.900	-0.023	-0.050	-0.151
		(0.261)	(0.259)	(0.238)
		[0.997]	[0.994]	[0.961]
	N=3,567	N=3,567	N=3,567	N=3,515
Feel very productive at work [survey]	0.449	-0.018	-0.013	-0.021
		(0.018)	(0.018)	(0.017)
		[0.930]	[0.991]	[0.868]
	N=3,567	N=3,567	N=3,567	N=3,515
Received promotion [survey]	0.472	0.008	0.000	0.002
		(0.018)	(0.018)	(0.018)
		[0.995]	[0.994]	[0.978]
	N=3,562	N=3,562	N=3,562	N=3,511
Job search very likely [survey]	0.139	0.031**	0.026**	0.027**
		(0.012)	(0.012)	(0.011)
		[0.095]	[0.208]	[0.143]
	N=3,561	N=3,561	N=3,561	N=3,511
Job search somewhat/very likely [survey]	0.337	0.019	0.012	0.013
		(0.017)	(0.017)	(0.016)
		[0.908]	[0.991]	[0.961]
	N=3,561	N=3,561	N=3,561	N=3,511

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.4a for additional details.

Table A.4e: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
B. Employment and Productivity [admin/survey]				
Productivity index [survey/admin]	0.000	-0.046	-0.062	-0.060
		(0.061)	(0.061)	(0.056)
		[0.450]	[0.307]	[0.283]
	N=3,309	N=3,309	N=3,309	N=3,300

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.4a for additional details.

Table A.4f: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
C. Health Status and Behaviors [admin]				
IL Marathon/10K/5K 2017 [admin]	0.066	0.002	0.002	-0.005
		(0.008)	(0.008)	(0.006)
		[0.975]	[0.962]	[0.471]
	N=4,834	N=4,834	N=4,834	N=4,817
Campus gym visits (days/year) [admin]	5.839	-0.062	-0.068	0.401
		(0.733)	(0.721)	(0.360)
		[0.975]	[0.962]	[0.471]
	N=4,834	N=4,834	N=4,834	N=4,817

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.4a for additional details.

Table A.4g: First-Year Treatment Effects (ITT)

Outcome Variable	(1) Mean	(2) No Controls	(3) Strata FEs	(4) Post-Lasso
C. Health Status and Behaviors [survey]				
Ever screened [survey]	0.942	0.039***	0.042***	0.036***
		(0.009)	(0.009)	(0.008)
		[0.001]	[0.000]	[0.000]
	N=3,567	N=3,567	N=3,567	N=3,557
Physically active [survey]	0.381	0.015	0.016	-0.009
		(0.017)	(0.017)	(0.012)
		[0.991]	[0.981]	[0.977]
	N=3,567	N=3,567	N=3,567	N=3,557
Trying to be active [survey]	0.825	0.005	0.007	0.017
		(0.014)	(0.014)	(0.012)
		[1.000]	[0.996]	[0.723]
	N=3,567	N=3,567	N=3,567	N=3,557
Current smoker (cigarettes) [survey]	0.060	-0.023**	-0.022**	-0.009*
		(0.009)	(0.009)	(0.005)
		[0.139]	[0.159]	[0.589]
	N=3,566	N=3,566	N=3,566	N=3,556
Drinker [survey]	0.672	-0.012	-0.013	-0.003
		(0.017)	(0.016)	(0.013)
		[0.998]	[0.983]	[0.992]
	N=3,565	N=3,565	N=3,565	N=3,555
Heavy drinker [survey]	0.047	-0.003	-0.002	0.003
		(0.008)	(0.008)	(0.007)
		[1.000]	[0.999]	[0.992]
	N=3,563	N=3,563	N=3,563	N=3,553
Chronic condition [survey]	0.735	-0.004	0.003	0.001
		(0.016)	(0.015)	(0.012)
		[1.000]	[0.999]	[0.997]
	N=3,565	N=3,565	N=3,565	N=3,555
Excellent or v. good health [survey]	0.564	-0.004	-0.007	-0.024
		(0.018)	(0.017)	(0.015)
		[1.000]	[0.996]	[0.689]
	N=3,567	N=3,567	N=3,567	N=3,557
Not poor health [survey]	0.990	-0.004	-0.005	-0.005*
		(0.003)	(0.003)	(0.003)
		[0.952]	[0.863]	[0.675]
	N=3,567	N=3,567	N=3,567	N=3,557
Physical problems [survey]	0.403	-0.007	-0.003	0.001
		(0.018)	(0.017)	(0.015)
		[1.000]	[0.999]	[0.997]
	N=3,567	N=3,567	N=3,567	N=3,557
Lots of energy [survey]	0.309	0.040**	0.039**	0.027*
		(0.016)	(0.016)	(0.014)
		[0.176]	[0.166]	[0.530]
	N=3,566	N=3,566	N=3,566	N=3,556
Bad emotional health [survey]	0.311	0.017	0.015	0.021
		(0.016)	(0.016)	(0.015)
		[0.977]	[0.981]	[0.723]
	N=3,566	N=3,566	N=3,566	N=3,556
Overweight [survey]	0.562	0.009	0.018	0.027**
		(0.018)	(0.017)	(0.011)
		[0.999]	[0.980]	[0.162]
	N=3,567	N=3,567	N=3,567	N=3,557
High BP/cholesterol/glucose [survey]	0.324	0.005	0.015	0.020
		(0.017)	(0.016)	(0.013)
		[1.000]	[0.981]	[0.699]
	N=3,567	N=3,567	N=3,567	N=3,557
Sedentary [survey]	0.560	0.001	-0.002	-0.008
		(0.018)	(0.017)	(0.013)
		[1.000]	[0.999]	[0.977]
	N=3,565	N=3,565	N=3,565	N=3,555

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.4a for additional details.

Table A.5a: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
A. Medical Spending [admin]						
Total spending (dollars/month) [admin]	17.7	34.2	52.3	-137.3**	-161.7**	-103.8*
	(79.0)	(78.7)	(59.4)	(68.6)	(66.0)	(61.9)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Drug spending [admin]	-13.8	-8.8	-12.8	-26.3	-34.5	-7.3
	(43.2)	(41.5)	(20.4)	(27.2)	(26.8)	(12.0)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Office spending [admin]	-9.9	-9.4	-3.1	12.2	9.5	8.7*
	(16.2)	(15.9)	(6.8)	(7.5)	(7.2)	(5.1)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Hospital spending [admin]	36.1	47.3	45.2	-118.0**	-126.7**	-83.4
	(50.4)	(52.1)	(45.6)	(55.7)	(52.8)	(51.8)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Non-zero medical spending [admin]	-0.013	-0.012	0.004	0.061***	0.043***	0.036***
	(0.018)	(0.018)	(0.016)	(0.014)	(0.013)	(0.012)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140

Notes: Each row and column reports estimates from a separate regression. The outcome in each regression is specified by the table row, and the (endogenous) focal independent variable is an indicator for completing the screening and HRA. For the IV specifications (columns (1)-(3)), the instrument is an indicator for inclusion in the treatment group, and observations include individuals in the control or treatment groups. For the OLS specifications (columns (4)-(6)), there is no instrument and observations are restricted to individuals in the treatment group. The control strategy is specified by the column. Post-Lasso controls include covariates selected by Lasso to predict either the dependent variable or the focal independent variable. The set of potential predictors include baseline values of all available variables in the same family of outcomes, strata variables, and the baseline (2016) survey variables reported in Table 1a, as well as all two-way interactions between these predictors. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.5b: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
A. Medical Spending [survey]						
Pharmaceutical drug utilization [survey]	-0.017	-0.013	0.000	0.022	0.018	0.018
	(0.024)	(0.023)	(0.020)	(0.019)	(0.019)	(0.019)
	N=3,567	N=3,567	N=2,433	N=2,410	N=2,410	N=1,641
Physician/ER utilization [survey]	0.004	0.002	0.025	0.024	0.020	0.016
	(0.024)	(0.023)	(0.025)	(0.019)	(0.019)	(0.022)
	N=3,567	N=3,567	N=2,433	N=2,410	N=2,410	N=1,641
Hospital utilization [survey]	0.005	0.006	0.012	-0.009	-0.010	-0.015
	(0.008)	(0.008)	(0.010)	(0.007)	(0.008)	(0.010)
	N=3,567	N=3,567	N=2,433	N=2,410	N=2,410	N=1,641

Notes: See notes to Appendix Table A.5a.

Table A.5c: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
B. Employment and Productivity [admin]						
Annual salary (share of baseline salary) [admin]	-0.000	-0.003	-0.003	0.004	0.005	0.006
	(0.008)	(0.008)	(0.008)	(0.005)	(0.005)	(0.005)
	N=4,146	N=4,146	N=4,130	N=2,840	N=2,840	N=2,828
Job promotion [admin]	-0.006	-0.010	-0.009	0.019	0.015	0.009
	(0.022)	(0.021)	(0.021)	(0.014)	(0.014)	(0.015)
	N=4,146	N=4,146	N=4,130	N=2,840	N=2,840	N=2,828
Job title change [admin]	-0.011	-0.015	-0.015	0.015	0.012	0.006
	(0.022)	(0.022)	(0.022)	(0.015)	(0.015)	(0.015)
	N=4,146	N=4,146	N=4,130	N=2,840	N=2,840	N=2,828
Job terminated [admin]	-0.022	-0.024	-0.023	-0.080***	-0.078***	-0.063***
	(0.018)	(0.017)	(0.017)	(0.011)	(0.011)	(0.011)
	N=4834.000	N=4834.000	N=4753.000	N=3,300	N=3,300	N=3,244
Sick leave (days/year) [admin]	0.322	0.432	0.224	0.275	0.039	-0.068
	(0.398)	(0.358)	(0.344)	(0.272)	(0.253)	(0.251)
	N=4,782	N=4,782	N=4,712	N=3,264	N=3,264	N=3,216

Notes: See notes to Appendix Table A.5a.

Table A.5d: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
B. Employment and Productivity [survey]						
Any sick days in past year [survey]	0.007	0.011	0.021	0.004	-0.004	-0.020
	(0.027)	(0.026)	(0.024)	(0.021)	(0.021)	(0.019)
	N=3,565	N=3,565	N=3,514	N=2,409	N=2,409	N=2,376
Worked 50+ hours/week [survey]	-0.006	-0.013	0.008	-0.037**	-0.034**	-0.009
	(0.020)	(0.018)	(0.015)	(0.016)	(0.015)	(0.012)
	N=3,566	N=3,566	N=3,515	N=2,409	N=2,409	N=2,376
Very satisfied with job [survey]	-0.038	-0.042	-0.043*	-0.017	-0.018	-0.012
	(0.027)	(0.026)	(0.023)	(0.021)	(0.021)	(0.018)
	N=3,564	N=3,564	N=3,512	N=2,407	N=2,407	N=2,373
Very or somewhat satisfied with job [survey]	-0.006	-0.009	-0.020	0.003	0.001	0.005
	(0.020)	(0.020)	(0.018)	(0.016)	(0.016)	(0.015)
	N=3,564	N=3,564	N=3,512	N=2,407	N=2,407	N=2,373
Management priority on health/safety [survey]	0.087***	0.087***	0.077***	-0.004	-0.012	-0.007
	(0.023)	(0.023)	(0.021)	(0.017)	(0.017)	(0.016)
	N=3,566	N=3,566	N=3,514	N=2,410	N=2,410	N=2,376
Happier at work than last year [survey]	0.014	0.008	-0.004	0.022	0.023	0.013
	(0.027)	(0.027)	(0.027)	(0.021)	(0.022)	(0.021)
	N=3,562	N=3,562	N=3,510	N=2,408	N=2,408	N=2,374
Presenteeism [survey]	-0.035	-0.076	-0.226	-0.378	-0.304	-0.334
	(0.397)	(0.391)	(0.361)	(0.312)	(0.314)	(0.289)
	N=3,567	N=3,567	N=3,515	N=2,410	N=2,410	N=2,376
Feel very productive at work [survey]	-0.027	-0.020	-0.030	-0.040*	-0.043**	-0.036*
	(0.027)	(0.027)	(0.026)	(0.021)	(0.021)	(0.020)
	N=3,567	N=3,567	N=3,515	N=2,410	N=2,410	N=2,376
Received promotion [survey]	0.012	0.000	0.001	0.032	0.039*	0.024
	(0.027)	(0.027)	(0.027)	(0.021)	(0.021)	(0.021)
	N=3,562	N=3,562	N=3,511	N=2,408	N=2,408	N=2,375
Job search very likely [survey]	0.047**	0.040**	0.039**	-0.011	-0.013	-0.001
	(0.018)	(0.018)	(0.017)	(0.015)	(0.015)	(0.014)
	N=3,561	N=3,561	N=3,511	N=2,406	N=2,406	N=2,374
Job search somewhat/very likely [survey]	0.028	0.019	0.018	-0.030	-0.033*	-0.023
	(0.026)	(0.025)	(0.024)	(0.021)	(0.020)	(0.019)
	N=3,561	N=3,561	N=3,511	N=2,406	N=2,406	N=2,374

Notes: See notes to Appendix Table A.5a.

Table A.5e: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
B. Employment and Productivity [admin/survey]						
Productivity index [survey/admin]	-0.070	-0.093	-0.096	0.069	0.092	0.083
	(0.092)	(0.091)	(0.085)	(0.073)	(0.074)	(0.067)
	N=3,309	N=3,309	N=3,300	N=2,245	N=2,245	N=2,240

Notes: See notes to Appendix Table A.5a.

Table A.5f: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
C. Health Status and Behaviors [admin]						
IL Marathon/10K/5K 2017 [admin]	0.003	0.003	-0.011	0.059***	0.054***	0.024***
	(0.014)	(0.013)	(0.011)	(0.008)	(0.008)	(0.006)
	N=4834.000	N=4834.000	N=4,817	N=3,300	N=3,300	N=3,287
Campus gym visits (days/year) [admin]	-0.110	-0.121	0.757	3.527***	3.849***	2.160***
	(1.309)	(1.276)	(0.656)	(0.813)	(0.804)	(0.425)
	N=4834.000	N=4834.000	N=4,817	N=3,300	N=3,300	N=3,287

Notes: See notes to Appendix Table A.5a.

Table A.5g: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
C. Health Status and Behaviors [survey]						
Ever screened [survey]	0.060***	0.065***	0.056***	0.073***	0.074***	0.061***
	(0.014)	(0.013)	(0.012)	(0.011)	(0.010)	(0.009)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Physically active [survey]	0.023	0.025	-0.016	0.020	0.032	0.027*
	(0.026)	(0.026)	(0.019)	(0.021)	(0.020)	(0.015)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Trying to be active [survey]	0.008	0.010	0.028	0.052***	0.049***	0.036**
	(0.021)	(0.020)	(0.018)	(0.017)	(0.017)	(0.015)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Current smoker (cigarettes) [survey]	-0.035**	-0.034**	-0.014*	-0.033***	-0.032***	-0.005
	(0.014)	(0.013)	(0.008)	(0.010)	(0.010)	(0.006)
	N=3,566	N=3,566	N=3,556	N=2,410	N=2,410	N=2,404
Drinker [survey]	-0.018	-0.020	-0.007	0.010	0.015	-0.010
	(0.025)	(0.025)	(0.021)	(0.020)	(0.020)	(0.017)
	N=3,565	N=3,565	N=3,555	N=2,409	N=2,409	N=2,403
Heavy drinker [survey]	-0.004	-0.002	0.005	-0.003	-0.003	0.001
	(0.012)	(0.012)	(0.010)	(0.009)	(0.009)	(0.008)
	N=3,563	N=3,563	N=3,553	N=2,408	N=2,408	N=2,402
Chronic condition [survey]	-0.005	0.005	0.000	0.033*	0.037**	0.016
	(0.024)	(0.023)	(0.018)	(0.019)	(0.019)	(0.014)
	N=3,565	N=3,565	N=3,555	N=2,409	N=2,409	N=2,403
Excellent or v. good health [survey]	-0.007	-0.011	-0.034	-0.015	-0.018	0.005
	(0.027)	(0.026)	(0.023)	(0.021)	(0.021)	(0.018)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Not poor health [survey]	-0.006	-0.007	-0.008	0.009*	0.008	0.009*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Physical problems [survey]	-0.010	-0.005	0.000	0.025	0.026	0.011
	(0.027)	(0.026)	(0.024)	(0.021)	(0.021)	(0.020)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Lots of energy [survey]	0.060**	0.060**	0.036*	-0.030	-0.026	-0.013
	(0.025)	(0.024)	(0.022)	(0.020)	(0.020)	(0.018)
	N=3,566	N=3,566	N=3,556	N=2,410	N=2,410	N=2,404
Bad emotional health [survey]	0.026	0.022	0.035	-0.003	-0.005	0.003
	(0.025)	(0.025)	(0.023)	(0.020)	(0.020)	(0.019)
	N=3,566	N=3,566	N=3,556	N=2,410	N=2,410	N=2,404
Overweight [survey]	0.014	0.027	0.041**	0.031	0.029	-0.005
	(0.027)	(0.026)	(0.016)	(0.021)	(0.021)	(0.015)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
High BP/cholesterol/glucose [survey]	0.008	0.023	0.028	0.030	0.033*	0.032*
	(0.025)	(0.025)	(0.020)	(0.020)	(0.020)	(0.017)
	N=3,567	N=3,567	N=3,557	N=2,410	N=2,410	N=2,404
Sedentary [survey]	0.002	-0.003	-0.012	0.074***	0.056***	-0.003
	(0.027)	(0.026)	(0.020)	(0.021)	(0.021)	(0.016)
	N=3,565	N=3,565	N=3,555	N=2,408	N=2,408	N=2,402

Notes: See notes to Appendix Table A.5a.

Table A.5h: First-Year Treatment Effects: Experimental vs. Observational Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Experimental (IV)			Observational (OLS)		
Outcome Variable	No Controls	Strata FEs	Post-Lasso	No Controls	Strata FEs	Post-Lasso
D. Medical Utilization (Quantity) [admin]						
Time to first claim <= 1 month [admin]	-0.048	-0.045	-0.015	0.035	0.010	0.027
	(0.031)	(0.029)	(0.024)	(0.022)	(0.021)	(0.018)
	N=3,163	N=3,163	N=3,145	N=2,149	N=2,149	N=2,134
Time to first claim <= 2 months [admin]	-0.007	-0.002	0.019	0.054***	0.030	0.032*
	(0.029)	(0.027)	(0.023)	(0.021)	(0.020)	(0.017)
	N=3,166	N=3,166	N=3,145	N=2,152	N=2,152	N=2,134
Time to first claim <= 3 months [admin]	0.013	0.016	0.034	0.060***	0.035*	0.041**
	(0.027)	(0.025)	(0.023)	(0.019)	(0.019)	(0.017)
	N=3,167	N=3,167	N=3,145	N=2,153	N=2,153	N=2,134
Time to first claim <= 6 months [admin]	-0.014	-0.011	0.002	0.070***	0.050***	0.051***
	(0.023)	(0.022)	(0.020)	(0.017)	(0.016)	(0.015)
	N=3,176	N=3,176	N=3,147	N=2,160	N=2,160	N=2,136
Time to first claim <= 12 months [admin]	-0.013	-0.012	0.004	0.061***	0.043***	0.036***
	(0.018)	(0.018)	(0.016)	(0.014)	(0.013)	(0.012)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Pharmaceutical events (days/month) [admin]	-0.035	-0.013	0.015	-0.106**	-0.136***	-0.043**
	(0.061)	(0.058)	(0.030)	(0.045)	(0.043)	(0.022)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Physician office visits (days/month) [admin]	0.052	0.051	0.016	0.058*	0.044	0.042**
	(0.041)	(0.041)	(0.029)	(0.032)	(0.034)	(0.021)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140
Hospital stays (days/month) [admin]	-0.018	-0.009	0.041	-0.019	-0.038	-0.027
	(0.039)	(0.038)	(0.028)	(0.030)	(0.030)	(0.023)
	N=3,239	N=3,239	N=3,152	N=2,208	N=2,208	N=2,140

Notes: See notes to Appendix Table A.5a.

Table A.6a: First-Year Treatment Effects (ITT) by Treatment Group: Total Health Care Spending

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment Group (any)	10.83	20.95				
	(48.50)	(48.68)				
Group A* (A25, A75)			17.57	34.23		
			(62.07)	(62.45)		
Group B* (B25, B75)			82.07	89.42		
			(95.64)	(95.16)		
Group C* (C25, C75)			10.02	16.96		
			(59.47)	(59.36)		
Group *75 (A75, B75, C75)			-53.05	-53.70		
			(60.14)	(60.23)		
Group A25					21.14	29.89
					(66.39)	(66.55)
Group B25					159.19	171.44
					(129.55)	(129.16)
Group C25					-68.27	-58.39
					(58.59)	(57.21)
Group A75					-39.18	-14.83
					(69.71)	(69.46)
Group B75					-50.99	-49.65
					(70.29)	(70.57)
Group C75					42.45	45.81
					(81.02)	(80.89)
Constant	568.83***	561.91***	568.83***	562.02***	568.83***	562.01***
	(38.00)	(37.53)	(38.02)	(37.55)	(38.03)	(37.56)
N	3,239	3,239	3,239	3,239	3,239	3,239
Strata FE	No	Yes	No	Yes	No	Yes
F Test	0.82	0.67	0.90	0.90	0.52	0.54

Notes: Each column reports estimates from a separate regression estimated over individuals in the treatment and control groups in the claims sample. The outcome in each regression is average monthly health care spending over the first 12 months of the wellness program (August 2016 - July 2017), and regressions are weighted by the number of months of coverage. The independent variables are indicators for inclusion in the specified treatment groups. Regressions reported in columns (2), (4), and (6) are the same as those reported in columns (1), (3), and (5) respectively, but with the addition of strata fixed effects. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.6b: First-Year Treatment Effects (ITT) by Treatment Group: Any Health Care Spending

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment Group (any)	-0.008	-0.007				
	(0.011)	(0.011)				
Group A* (A25, A75)			0.004	0.004		
			(0.015)	(0.015)		
Group B* (B25, B75)			-0.012	-0.013		
			(0.016)	(0.015)		
Group C* (C25, C75)			-0.001	-0.006		
			(0.016)	(0.015)		
Group *75 (A75, B75, C75)			-0.009	-0.005		
			(0.013)	(0.012)		
Group A25					0.017	0.012
					(0.017)	(0.016)
Group B25					-0.015	-0.014
					(0.018)	(0.018)
Group C25					-0.011	-0.012
					(0.018)	(0.017)
Group A75					-0.018	-0.009
					(0.019)	(0.018)
Group B75					-0.019	-0.017
					(0.019)	(0.018)
Group C75					-0.000	-0.003
					(0.018)	(0.018)
Constant	0.907***	0.907***	0.907***	0.907***	0.907***	0.907***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
N	3,239	3,239	3,239	3,239	3,239	3,239
Strata FE	No	Yes	No	Yes	No	Yes
F Test	0.477	0.495	0.699	0.745	0.566	0.778

Notes: Each column reports estimates from a separate regression estimated over individuals in the treatment and control groups in the claims sample. The outcome in each regression is an indicator for positive health care spending over the first 12 months of the wellness program (August 2016 - July 2017). The independent variables are indicators for inclusion in the specified treatment groups. Regressions reported in columns (2), (4), and (6) are the same as those reported in columns (1), (3), and (5) respectively, but with the addition of strata fixed effects. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.7: First-Year IV Treatment Effects: Screening and Wellness Participation

	(1)	(2)	(3)	(4)
	Ever screened	Ever screened	Management priority on health/safety	Management priority on health/safety
Completed Screening and HRA	0.097***	0.098***	0.124**	0.117**
	(0.026)	(0.026)	(0.050)	(0.050)
Completed Fall and Spring Wellness Activities	-0.098	-0.087	-0.122	-0.103
	(0.061)	(0.059)	(0.119)	(0.118)
N	3,567	3,567	3,566	3,566
Strata FE	No	Yes	No	Yes
First-stage F-statistic	12.580	12.814	12.580	12.814

Notes: Each column reports estimates from a separate regression. The outcome variable is specified by the column heading. We instrument for both regressors using six indicators for inclusion in the six treatment groups. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level.

Table A.8: First-Year Winsorized Medical Spending Treatment Effects

	(1)	(2)	(3)	(4)	(5)
A. ITT Estimates (No Controls)					
Total spending (dollars/month) [admin]	10.8	-2.6	0.5	2.9	0.7
	(48.5)	(38.0)	(32.7)	(21.1)	(13.8)
	[-84.3, 105.9]	[-77.1, 72.0]	[-63.6, 64.6]	[-38.5, 44.2]	[-26.3, 27.7]
N	3,239	3,239	3,239	3,239	3,239
Winsorization (percent)	0	0.5	1	2.5	5
B. ITT Estimates (Post-Lasso)					
Total spending (dollars/month) [admin]	34.9	16.0	17.2	15.4	10.9
	(36.9)	(23.2)	(19.5)	(13.5)	(9.7)
	[-37.5, 107.2]	[-29.5, 61.5]	[-21.0, 55.3]	[-11.0, 41.9]	[-8.2, 30.0]
N	3,152	3,152	3,152	3,152	3,152
Winsorization (percent)	0	0.5	1	2.5	5
C. IV Estimates (No Controls)					
Total spending (dollars/month) [admin]	17.7	-4.2	0.8	4.6	1.2
	(79.0)	(62.0)	(53.3)	(34.4)	(22.5)
	[-137.2, 172.6]	[-125.7, 117.3]	[-103.6, 105.2]	[-62.7, 72.0]	[-42.9, 45.2]
N	3,239	3,239	3,239	3,239	3,239
Winsorization (percent)	0	0.5	1	2.5	5
D. IV Estimates (Post-Lasso)					
Total spending (dollars/month) [admin]	52.3	20.4	22.0	21.9	16.6
	(59.4)	(38.0)	(31.7)	(21.9)	(15.7)
	[-64.2, 168.7]	[-54.1, 94.9]	[-40.2, 84.2]	[-20.9, 64.8]	[-14.2, 47.5]
N	3,152	3,152	3,152	3,152	3,152
Winsorization (percent)	0	0.5	1	2.5	5

Notes: Each row and column reports estimates from a separate regression, where observations include individuals in the control or treatment groups. The outcome in each regression is winsorized (top-coded) average monthly health care spending over the first 12 months of the wellness program (August 2016 - July 2017), winsorized at the level indicated in each column. Regressions are weighted by the number of months of coverage. In Panels A and B (ITT), the focal independent variable is an indicator for inclusion in the treatment group. The specifications reported in Panel A do not include controls, while those reported in Panel B include the same controls as the ITT post-Lasso specification reported in row 1 and column (4) of Table 3. In Panels C and D (IV), the (endogenous) focal independent variable is an indicator for completing the screening and HRA and the instrument is an indicator for inclusion in the treatment group. The specifications reported in Panel C do not include controls, while those reported in Panel D include the same controls as the IV post-Lasso specification reported in row 1 and column (3) of Table 4. There is no winsorization of the outcome in column (1), and thus the ITT and IV estimates are identical to the total spending effects of the corresponding No Controls and Post-Lasso specifications reported in Table 3 and Table 4. Robust standard errors are reported in parentheses, and 95% confidence intervals are reported in brackets. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.9a: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
A. Medical Spending [admin]					
Total spending (dollars/month) [admin]	30	650.5	-74.7	-65.0	-39.7
			(58.5)	(58.0)	(47.9)
			[0.618]	[0.720]	[0.754]
		N=3,307	N=3,307	N=3,307	N=3,155
Drug spending [admin]	30	148.8	-25.2	-23.5	-22.2
			(27.7)	(27.6)	(16.4)
			[0.836]	[0.864]	[0.589]
		N=3,307	N=3,307	N=3,307	N=3,155
Office spending [admin]	30	74.2	-6.6	-6.0	-4.8
			(8.6)	(8.5)	(5.4)
			[0.836]	[0.864]	[0.754]
		N=3,307	N=3,307	N=3,307	N=3,155
Hospital spending [admin]	30	353.5	-31.7	-24.7	-20.3
			(35.6)	(35.5)	(31.9)
			[0.836]	[0.864]	[0.754]
		N=3,307	N=3,307	N=3,307	N=3,155
Non-zero medical spending [admin]	30	0.950	0.005	0.006	0.007
			(0.008)	(0.008)	(0.007)
			[0.836]	[0.864]	[0.754]
		N=3,307	N=3,307	N=3,307	N=3,155

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. Each row and column reports estimates from a separate regression, where observations include individuals in the control or treatment groups. The outcome in each regression is specified by the table row. The focal independent variable is an indicator for inclusion in the treatment group, and the control strategy is specified by the column. Post-Lasso controls include covariates selected by Lasso to predict the dependent variable. The set of potential predictors include baseline values of all available variables in the same family of outcomes, strata variables, and the baseline (2016) survey variables reported in Table 1a, as well as all two-way interactions between these predictors. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes. Family-wise p-values, reported in brackets, adjust for the number of outcome variables in the table.

Table A.9b: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
A. Medical Spending [survey]					
Pharmaceutical drug utilization [survey]	24	0.729	0.010	0.012	0.023
			(0.017)	(0.017)	(0.016)
			[0.911]	[0.845]	[0.393]
		N=3,019	N=3,019	N=3,019	N=2,104
Physician/ER utilization [survey]	24	0.765	-0.004	-0.007	-0.009
			(0.016)	(0.016)	(0.018)
			[0.911]	[0.874]	[0.695]
		N=3,019	N=3,019	N=3,019	N=2,105
Hospital utilization [survey]	24	0.027	0.003	0.003	0.006
			(0.006)	(0.006)	(0.007)
			[0.911]	[0.874]	[0.695]
		N=3,019	N=3,019	N=3,019	N=2,105

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.9a for additional details.

Table A.9c: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
B. Employment and Productivity [admin]					
Annual salary (share of baseline salary) [admin]	30	0.121	-0.001	0.001	-0.001
			(0.007)	(0.006)	(0.006)
			[1.000]	[0.996]	[0.998]
		N=3,635	N=3,635	N=3,635	N=3,619
Job promotion [admin]	30	0.360	0.006	0.004	0.006
			(0.017)	(0.017)	(0.016)
			[0.996]	[0.996]	[0.996]
		N=3,635	N=3,635	N=3,635	N=3,619
Job title change [admin]	30	0.377	-0.002	-0.004	-0.004
			(0.017)	(0.017)	(0.017)
			[1.000]	[0.996]	[0.998]
		N=3,635	N=3,635	N=3,635	N=3,619
Job terminated [admin]	30	0.204	0.002	0.000	0.002
			(0.012)	(0.012)	(0.012)
			[1.000]	[0.996]	[0.998]
		N=4,834	N=4,834	N=4,834	N=4,753
Sick leave (days/year) [admin]	30	6.066	0.013	0.059	0.018
			(0.204)	(0.175)	(0.169)
			[1.000]	[0.996]	[0.998]
		N=4,782	N=4,782	N=4,782	N=4,712

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.9a for additional details.

Table A.9d: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
B. Employment and Productivity [survey]					
Any sick days in past year [survey]	24	0.591	-0.009	-0.008	-0.007
			(0.019)	(0.019)	(0.017)
			[0.996]	[0.987]	[0.995]
		N=3,018	N=3,018	N=3,018	N=2,976
Worked 50+ hours/week [survey]	24	0.139	-0.034**	-0.032**	-0.023**
			(0.014)	(0.013)	(0.011)
			[0.136]	[0.154]	[0.383]
		N=3,018	N=3,018	N=3,018	N=2,976
Very satisfied with job [survey]	24	0.406	-0.010	-0.012	-0.006
			(0.019)	(0.019)	(0.017)
			[0.996]	[0.983]	[0.995]
		N=3,017	N=3,017	N=3,017	N=2,975
Very or somewhat satisfied with job [survey]	24	0.833	0.004	0.003	-0.002
			(0.015)	(0.015)	(0.013)
			[0.996]	[0.987]	[0.995]
		N=3,017	N=3,017	N=3,017	N=2,975
Management priority on health/safety [survey]	24	0.784	0.028*	0.028*	0.024
			(0.016)	(0.016)	(0.015)
			[0.539]	[0.534]	[0.632]
		N=3,018	N=3,018	N=3,018	N=2,976
Happier at work than last year [survey]	24	0.541	0.006	0.005	-0.001
			(0.019)	(0.019)	(0.019)
			[0.996]	[0.987]	[0.995]
		N=3,012	N=3,012	N=3,012	N=2,970
Presenteeism [survey]	24	23.899	0.316	0.292	0.258
			(0.282)	(0.281)	(0.258)
			[0.896]	[0.923]	[0.924]
		N=3,020	N=3,020	N=3,020	N=2,978
Feel very productive at work [survey]	24	0.437	-0.005	-0.007	-0.008
			(0.019)	(0.019)	(0.019)
			[0.996]	[0.987]	[0.995]
		N=3,017	N=3,017	N=3,017	N=2,975
Received promotion [survey]	24	0.487	-0.008	-0.013	-0.017
			(0.019)	(0.019)	(0.019)
			[0.996]	[0.983]	[0.930]
		N=3,017	N=3,017	N=3,017	N=2,975
Job search very likely [survey]	24	0.119	0.018	0.016	0.017
			(0.012)	(0.012)	(0.012)
			[0.742]	[0.797]	[0.740]
		N=3,016	N=3,016	N=3,016	N=2,974
Job search somewhat/very likely [survey]	24	0.296	0.015	0.018	0.019
			(0.018)	(0.017)	(0.016)
			[0.962]	[0.923]	[0.872]
		N=3,016	N=3,016	N=3,016	N=2,974

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.9a for additional details.

Table A.9e: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
B. Employment and Productivity [admin/survey]					
Productivity index [survey/admin]	24	0.000	-0.015	-0.025	-0.054
			(0.062)	(0.062)	(0.056)
			[0.805]	[0.686]	[0.328]
		N=2,890	N=2,890	N=2,890	N=2,881

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.9a for additional details.

Table A.9f: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
C. Health Status and Behaviors [admin]					
IL Marathon/10K/5K 2018 [admin]	30	0.052	0.006	0.006	0.001
			(0.007)	(0.007)	(0.006)
			[0.625]	[0.594]	[0.995]
		N=4,834	N=4,834	N=4,834	N=4,817
Campus gym visits (days/year) [admin]	30	5.047	-0.342	-0.337	0.001
			(0.660)	(0.649)	(0.367)
			[0.625]	[0.595]	[0.998]
		N=4,834	N=4,834	N=4,834	N=4,817

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.9a for additional details.

Table A.9g: Longer-Run Treatment Effects (ITT)

Outcome Variable	(1) Horizon (months)	(2) Mean	(3) No Controls	(4) Strata FEs	(5) Post-Lasso
C. Health Status and Behaviors [survey]					
Ever screened [survey]	24	0.962	0.029***	0.031***	0.027***
			(0.008)	(0.008)	(0.007)
			[0.006]	[0.003]	[0.005]
		N=3,020	N=3,020	N=3,020	N=3,010
Physically active [survey]	24	0.373	0.039**	0.044**	0.030**
			(0.019)	(0.018)	(0.014)
			[0.359]	[0.170]	[0.363]
		N=3,020	N=3,020	N=3,020	N=3,010
Trying to be active [survey]	24	0.809	-0.004	-0.001	0.003
			(0.015)	(0.015)	(0.013)
			[1.000]	[1.000]	[0.999]
		N=3,020	N=3,020	N=3,020	N=3,010
Current smoker (cigarettes) [survey]	24	0.057	-0.021**	-0.023**	-0.013**
			(0.010)	(0.009)	(0.006)
			[0.290]	[0.180]	[0.387]
		N=3,017	N=3,017	N=3,017	N=3,007
Drinker [survey]	24	0.665	-0.009	-0.011	0.003
			(0.018)	(0.018)	(0.014)
			[1.000]	[1.000]	[0.999]
		N=3,017	N=3,017	N=3,017	N=3,007
Heavy drinker [survey]	24	0.048	0.005	0.005	0.007
			(0.008)	(0.008)	(0.007)
			[1.000]	[1.000]	[0.980]
		N=3,017	N=3,017	N=3,017	N=3,007
Chronic condition [survey]	24	0.758	-0.003	0.001	-0.006
			(0.017)	(0.016)	(0.013)
			[1.000]	[1.000]	[0.999]
		N=3,020	N=3,020	N=3,020	N=3,010
Excellent or v. good health [survey]	24	0.569	0.009	0.008	-0.005
			(0.019)	(0.019)	(0.017)
			[1.000]	[1.000]	[0.999]
		N=3,020	N=3,020	N=3,020	N=3,010
Not poor health [survey]	24	0.992	-0.006**	-0.006*	-0.006**
			(0.003)	(0.003)	(0.003)
			[0.359]	[0.462]	[0.456]
		N=3,020	N=3,020	N=3,020	N=3,010
Physical problems [survey]	24	0.406	-0.011	-0.009	-0.011
			(0.019)	(0.019)	(0.017)
			[1.000]	[1.000]	[0.998]
		N=3,020	N=3,020	N=3,020	N=3,010
Lots of energy [survey]	24	0.316	0.030*	0.032*	0.027*
			(0.018)	(0.018)	(0.016)
			[0.650]	[0.524]	[0.625]
		N=3,019	N=3,019	N=3,019	N=3,009
Bad emotional health [survey]	24	0.296	-0.005	-0.008	-0.004
			(0.018)	(0.018)	(0.016)
			[1.000]	[1.000]	[0.999]
		N=3,018	N=3,018	N=3,018	N=3,008
Overweight [survey]	24	0.564	0.005	0.008	0.006
			(0.019)	(0.019)	(0.013)
			[1.000]	[1.000]	[0.999]
		N=3,019	N=3,019	N=3,019	N=3,010
High BP/cholesterol/glucose [survey]	24	0.330	-0.011	-0.002	0.004
			(0.018)	(0.018)	(0.015)
			[1.000]	[1.000]	[0.999]
		N=3,019	N=3,019	N=3,019	N=3,009
Sedentary [survey]	24	0.553	0.008	0.009	-0.007
			(0.019)	(0.019)	(0.015)
			[1.000]	[1.000]	[0.999]
		N=3,018	N=3,018	N=3,018	N=3,008

Notes: The outcomes in this table constitute a single family of outcomes for calculating family-wise p-values. See notes to Appendix Table A.9a for additional details.

Table A.10: The Loadings of the First Principal Component of Productivity

Productivity Variables	(1) Baseline	(2) First-Year Follow-Up	(3) Longer-Run Follow-Up
Sick leave (days/year) [admin]	-0.429	-0.064	-0.053
Any sick days in past year [survey]	-0.402	-0.050	-0.042
Worked 50+ hours/week [survey]	0.293	-0.035	-0.024
Management priority on health/safety [survey]	0.299	0.229	0.235
Annual salary (dollars) [admin]	0.364	N/A	N/A
Very or somewhat satisfied with job [survey]	0.409	0.342	0.381
Very satisfied with job [survey]	0.424	0.320	0.363
Job search somewhat/very likely [survey]	N/A	-0.307	-0.335
Job search very likely [survey]	N/A	-0.283	-0.303
Feel very productive at work [survey]	N/A	0.209	0.257
Annual salary (share of baseline salary) [admin]	N/A	0.232	0.208
Received promotion [survey]	N/A	0.250	0.233
Happier at work than last year [survey]	N/A	0.306	0.337
Job title change [admin]	N/A	0.379	0.292
Job promotion [admin]	N/A	0.386	0.309

Notes: The first principal component of productivity corresponds to the "productivity index" outcome reported in other tables. This component is calculated as a linear combination of productivity variables, where the weights in that linear combination are equal to the loadings reported in this table and the variables in that linear combination are normalized to have a mean of zero and variance of one. The sum of the squared loadings is equal to one for each column.

Table A.11: Associations Between Administrative and Survey Measures of Productivity

	(1) Annual salary (share of baseline salary)	(2) Job promotion	(3) Job title change	(4) Job terminated	(5) Sick leave (days/year)
Any sick days in past year [survey]	-0.009*	0.005	0.009	-0.026***	3.242***
	(0.005)	(0.014)	(0.014)	(0.007)	(0.240)
	N=3,322	N=3,322	N=3,322	N=3,565	N=3,565
Worked 50+ hours/week [survey]	0.006	-0.032*	-0.036**	0.011	-3.278***
	(0.007)	(0.018)	(0.018)	(0.010)	(0.295)
	N=3,323	N=3,323	N=3,323	N=3,566	N=3,566
Very satisfied with job [survey]	0.011**	0.021	0.021	-0.013*	-1.004***
	(0.005)	(0.014)	(0.014)	(0.007)	(0.250)
	N=3,320	N=3,320	N=3,320	N=3,564	N=3,564
Very or somewhat satisfied with job [survey]	0.026***	0.050***	0.043**	-0.026**	-1.440***
	(0.005)	(0.017)	(0.017)	(0.011)	(0.334)
	N=3,320	N=3,320	N=3,320	N=3,564	N=3,564
Management priority on health/safety [survey]	0.013**	0.048***	0.046***	-0.023**	-0.184
	(0.005)	(0.015)	(0.016)	(0.010)	(0.299)
	N=3,322	N=3,322	N=3,322	N=3,566	N=3,566
Happier at work than last year [survey]	0.026***	0.085***	0.089***	-0.004	-0.894***
	(0.005)	(0.013)	(0.013)	(0.007)	(0.249)
	N=3,319	N=3,319	N=3,319	N=3,562	N=3,562
Feel very productive at work [survey]	0.004	0.017	0.014	-0.011	0.130
	(0.005)	(0.014)	(0.014)	(0.007)	(0.245)
	N=3,323	N=3,323	N=3,323	N=3,567	N=3,567
Received promotion [survey]	0.050***	0.229***	0.225***	-0.013*	0.007
	(0.005)	(0.013)	(0.013)	(0.007)	(0.246)
	N=3,319	N=3,319	N=3,319	N=3,562	N=3,562
Job search very likely [survey]	0.003	-0.049**	-0.046**	0.166***	-1.522***
	(0.007)	(0.019)	(0.020)	(0.018)	(0.347)
	N=3,319	N=3,319	N=3,319	N=3,561	N=3,561
Job search somewhat/very likely [survey]	0.004	-0.042***	-0.039***	0.086***	-0.502*
	(0.005)	(0.014)	(0.014)	(0.009)	(0.262)
	N=3,319	N=3,319	N=3,319	N=3,561	N=3,561
Sample size (outcome mean)	3,309	3,309	3,309	3,550	3,550
Outcome mean	0.061	0.184	0.192	0.045	6.473

Notes: Each row and column reports estimates from a separate regression, where observations include all individuals who completed the one-year follow-up survey. The outcome in each regression is specified by the table column. The independent variable is the survey response, which is always an indicator variable. (The Presenteeism survey variable is omitted from this table.) The outcome mean is calculated for the sample of observations that have non-missing values for all survey variables listed in this table. Regressions are unweighted. Robust standard errors are reported in parentheses. A */**/*** indicates significance at the 10/5/1% level using conventional inference, i.e., not adjusting for multiple outcomes.

Table A.12: Tests of Differential Attrition Between Control and Treatment Groups

	(1) Control	(2) Treatment	(3) Difference	(4) p-value
Health insurance enrollment (first 12 months)	0.634	0.638	0.004	0.768
Health insurance enrollment (first 30 months)	0.613	0.615	0.002	0.887
Job terminated (first 12 months)	0.122	0.109	-0.013	0.210
Job terminated (first 30 months)	0.202	0.204	0.002	0.862
2017 survey	0.754	0.730	-0.024	0.075
2018 survey	0.646	0.615	-0.031	0.036
Sample size	1,534	3,300		

Notes: This table reports health insurance enrollment rates and job termination rates for the first 12 and the first 30 months following randomization, and completion rates for the 2017 and 2018 online surveys. An individual's insurance enrollment is defined as the number of covered months divided by the length of the sample period (either 12 or 30 months). Columns (1)-(2) report unweighted means for the control and treatment groups. Column (3) reports the difference between the two means and column (4) reports the p-value from a joint test of equality of the two means.

Table A.13: First-Year Winsorized Medical Spending Treatment Effects

	(1)	(2)	(3)	(4)	(5)
A. ITT Estimates (Post-Lasso)					
Total spending (dollars/month) [admin]	34.9 (36.9) [-37.5, 107.2]	16.0 (23.2) [-29.5, 61.5]	17.2 (19.5) [-21.0, 55.3]	15.4 (13.5) [-11.0, 41.9]	10.9 (9.7) [-8.2, 30.0]
N	3,152	3,152	3,152	3,152	3,152
Winsorization (percent)	0	0.5	1	2.5	5
B. IV Estimates (Post-Lasso)					
Total spending (dollars/month) [admin]	52.3 (59.4) [-64.2, 168.7]	20.4 (38.0) [-54.1, 94.9]	22.0 (31.7) [-40.2, 84.2]	21.9 (21.9) [-20.9, 64.8]	16.6 (15.7) [-14.2, 47.5]
N	3,152	3,152	3,152	3,152	3,152
Winsorization (percent)	0	0.5	1	2.5	5

Notes: Each row and column reports estimates from a separate regression, where observations include individuals in the control or treatment groups. The outcome in each regression is winsorized (top-coded) average monthly medical spending over the first 12 months of the intervention, winsorized at the level indicated in each column. Regressions are weighted by the number of months of coverage. In Panel A (ITT), the focal independent variable is an indicator for inclusion in the treatment group, and all regressions include the same controls as the ITT post-Lasso specification reported in row 1 and column (4) of Table 3. In Panel B (IV), the (endogenous) focal independent variable is an indicator for completing the screening and HRA, the instrument is an indicator for inclusion in the treatment group, and all regressions include the same controls as the IV post-Lasso specification reported in row 1 and column (3) of Table 4. Column (1) replicates the (non-winsorized) ITT and IV post-Lasso results reported in Table 3 and Table 4. Robust standard errors are reported in parentheses, and 95% confidence intervals are reported in brackets. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.14: Longer-Run Winsorized Medical Spending Treatment Effects

	(1)	(2)	(3)	(4)	(5)
A. ITT Estimates (Post-Lasso)					
Total spending (dollars/month) [admin]	-39.7 (47.9) [-133.7, 54.3]	-1.4 (24.7) [-49.8, 47.0]	5.7 (20.1) [-33.8, 45.1]	12.2 (13.9) [-15.0, 39.4]	10.2 (9.8) [-9.1, 29.5]
N	3,155	3,155	3,155	3,155	3,155
Winsorization (percent)	0	0.5	1	2.5	5

Notes: Each row and column reports estimates from a separate regression, where observations include individuals in the control or treatment groups. The outcome in each regression is winsorized (top-coded) average monthly medical spending over the first 29 months of the intervention, winsorized at the level indicated in each column. Regressions are weighted by the number of months of coverage. In Panel A (ITT), the focal independent variable is an indicator for inclusion in the treatment group, and all regressions include the same controls as the ITT post-Lasso specification reported in row 1 and column (5) of Table 3. Column (1) replicates the (non-winsorized) ITT result reported in Table 3. Robust standard errors are reported in parentheses, and 95% confidence intervals are reported in brackets. A */**/*** indicates significance at the 10/5/1% level using conventional inference.

Table A.15: Meta-Analysis Estimates of Publication Bias

(1)	(2)	(3)	(4)
Student-t Distribution of Wellness Program Effects			Relative Publication Probability for $p > 0.05$
$\bar{\theta}$	$\tilde{\tau}$	ν	$\beta_{1,p}$
-0.583	0.385	1.990	0.369
(0.398)	(0.302)	(0.478)	(0.153)

Notes: Using the method of Andrews and Kasy (Forthcoming), we estimate the model given by Equation A.1. Table reports the meta-analysis estimates of the bias-corrected distribution of wellness program effects on medical spending and absenteeism, with location ($\bar{\theta}$), scale ($\tilde{\tau}$), and degrees of freedom ($\tilde{\nu}$) parameters for a Student-t distribution. Publication probability $\beta_{1,p}$ for studies not significant at the 5% level is normalized relative to studies significant at the 5% level.

Table A.16: Variable Definitions

Variable Name	Data Source	Survey Question(s)	Formula	Time Period
Male	Human resources data (C)	N/A	Sex = Male	May 30, 2016
Age 50+	Human resources data (C)	N/A	$50 \leq$ Age	May 30, 2016
Age 37-49	Human resources data (C)	N/A	$37 \leq$ Age ≤ 49	May 30, 2016
White	Human resources data (C)	N/A	Race = White	May 30, 2016
Salary Q1 (bottom quartile)	Human resources data (C)	N/A	Salary $\leq$ 25th percentile	Pre-period: May 30, 2016 Post-periods: August 15, 2017 January 31, 2019
Salary Q2	Human resources data (C)	N/A	25th pctile $\leq$ Salary $\leq$ 50th pctile	Pre-period: May 30, 2016 Post-periods: August 15, 2017 January 31, 2019
Salary Q3	Human resources data (C)	N/A	50th pctile $\leq$ Salary $\leq$ 75th pctile	Pre-period: May 30, 2016 Post-periods: August 15, 2017 January 31, 2019
Faculty	Human resources data (C)	N/A	Employment Class = Faculty	May 30, 2016
Academic Staff	Human resources data (C)	N/A	Employment Class = Academic Staff	May 30, 2016
Annual salary	Human resources data (C)	N/A	N/A	Pre-period: May 30, 2016 Post-periods: August 15, 2017 January 31, 2019
Annual salary (share of baseline salary)	Human resources data (C)	N/A	(Current salary / May 30, 2016 Salary) - 1	Pre-period: N/A Post-periods: August 15, 2017 January 31, 2019
Job title change	Human resources data (C)	N/A	In case of multiple titles, only measures title changes associated with primary job.	Pre-period: N/A Post-periods: August 15, 2017 January 31, 2019

Table A.16: Variable Definitions

Variable Name	Data Source	Survey Question(s)	Formula	Time Period
Job promotion	Human resources data (C)	N/A	Job title change = 1 & Salary raise > 0	Pre-period: N/A Post-periods: August 15, 2017 January 31, 2019
Job terminated	Human resources data (C)	N/A	TerminationDate<= Current date	Pre-period: N/A Post-periods: August 15, 2017 January 31, 2019
Sick leave (days/year)	Human resources data (C)	N/A	Sick days are measured monthly for CS employees, and biannually (August 15th and May 15th) for AP and Faculty employees. Number of sick days is normalized by fraction of year employed.	Pre-period:[31] 8/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19
Ever screened	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A1 (G1) Have you ever had your cholesterol checked? A2 (G2) Have you ever had a blood test for high blood sugar or diabetes, other than during pregnancy? A3 (G3) Have you ever had a blood test for high blood sugar or diabetes? A4 (G4) In the last 12 months, have you had a Pap test or Pap smear? A5 (G5) In the last 12 months, have you had a mammogram? A8 (G8) In the last 12 months, have you had a sigmoidoscopy or a colonoscopy? A9 (G9) In the last 12 months, have you had a blood test to check for prostate cancer?	Any of A1-A5, A8-A9 (G1-G5, G8-G9) = "Yes"	(A) July 2016 (G) July 2017 (G) July 2018
Physically active	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A11 (G11) Compared with most people your age, would you say you are more physically active, less physically active, or about the same?	A11 (G11) ="More active"	(A) July 2016 (G) July 2017 (G) July 2018

[31] Pre- and post-period end dates are extended by 15 days for AP and Faculty employees (see description in Formula).

Table A.16: Variable Definitions

Variable Name	Data Source	Survey Question(s)	Formula	Time Period
Trying to be active	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A12 (G12) In the last 12 months, have you been told by a doctor or health professional to increase your physical activity or exercise? A13 (G13) Are you currently trying to increase your physical activity or exercise?	A12 (G12) = "Yes" or A13 (G13) = "Yes"	(A) July 2016 (G) July 2017 (G) July 2018
Current smoker (cigarettes)	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A16 (G16) Have you smoked at least 100 cigarettes in your entire life? A17 (G17) Do you now smoke cigarettes every day, some days, or not at all?	A16 (G16) = "Yes" and A17 (G17) = "Every day" or "Some days"	(A) July 2016 (G) July 2017 (G) July 2018
Current smoker (other)	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A22 (G22) Do you now smoke or use any other type of tobacco product, such as pipes, cigars, or chewing tobacco, every day, some days, or not at all? A23 (G23) Do you now use e-cigarettes (also known as vape-pens, hookah-pens, e-hookahs, or e-vaporizers) every day, some days, or not at all?	A22 (G22) & A23 (G23) != "Not at all"	(A) July 2016 (G) July 2017 (G) July 2018
Former smoker	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A16 (G16) Have you smoked at least 100 cigarettes in your entire life? A17 (G17) Do you now smoke cigarettes every day, some days, or not at all?	A16 (G16) = "Yes" and A17 (G17) = "Not at all"	(A) July 2016 (G) July 2017 (G) July 2018
Drinker	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A24 (G24) In the last 7 days, on how many days did you drink any type of alcoholic beverage?	A24 (G24) != 0	(A) July 2016 (G) July 2017 (G) July 2018
Heavy drinker	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A25 (G25) In the last 7 days, on the days when you did drink alcohol, how many drinks did you usually have per day? One ?drink? is a 12 ounce can of beer, a 5 ounce glass of wine, or a 1.5 ounce shot of liquor.	A25 (G25) $\geq$ 4 if female A25 (G25) $\geq$ 5 if male	(A) July 2016 (G) July 2017 (G) July 2018
Chronic condition	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A27 (G27) Have you ever been told by a doctor or other health professional that you have any of the following? Mark all that apply.	At least one box is checked	(A) July 2016 (G) July 2017 (G) July 2018
Excellent or v. good health	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A28 (G28) Overall, how would you rate your health during the past 4 weeks?	A28 (G28) = "Excellent" or "Very good"	(A) July 2016 (G) July 2017 (G) July 2018
Not poor health	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A28 (G28) Overall, how would you rate your health during the past 4 weeks?	A28 (G28) != "Poor"	(A) July 2016 (G) July 2017 (G) July 2018

Table A.16: Variable Definitions

Variable Name	Data Source	Survey Question(s)	Formula	Time Period
Physical problems	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A29 (G29) During the past 4 weeks, how much did physical health problems limit your usual physical activities (such as walking or climbing stairs)? A30 (G30) During the past 4 weeks, how much difficulty did you have doing your daily work, both at home and away from home, because of your physical health? A31 (G31) How much bodily pain have you had during the past 4 weeks?	A29 (G29)="Somewhat?, "Quite a lot?, "Could not do physical activities? **or** A30 (G30) = "Some?, "Quite a lot?, "Could not do daily work? **or** A31 (G31) = "Mild?, "Moderate?, "Severe?, "Very severe?	(A) July 2016 (G) July 2017 (G) July 2018
Lots of energy	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A32 (G32) During the past 4 weeks, how much energy did you have?	A32 (G32) = "An extraordinary amount", or "Quite a lot"	(A) July 2016 (G) July 2017 (G) July 2018
Bad emotional health	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A33 (G33) During the past 4 weeks, how much have you been bothered by emotional problems (such as feeling anxious, depressed or irritable)?	A33 (G33) ov= "Moderately", "Quite a lot", "Extremely"	(A) July 2016 (G) July 2017 (G) July 2018
Overweight	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A39 (39) How would you describe your body weight?	A39 (G39) = "Overweight" or "Very overweight"	
High BP / cholesterol / glucose	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A40 (G40) How would you describe your blood pressure level? That is, if we measured it right now, do you think your blood pressure level would be: A41 (G41) How would you describe your cholesterol level? That is, if we measured it right now, do you think your cholesterol level would be: A42 (G42) How would you describe your blood glucose level? That is, if we measured it right now, do you think your blood glucose level would be:	A40 or A41 or A42 (G40 or G41 or G42) = "High" or "Very high"	(A) July 2016 (G) July 2017 (G) July 2018
Sedentary	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A53 (G63) On an average day, how often does your job involve standing or walking around?	A53 (G63) = "None at all" or "Some, but less than 1 hour"	(A) July 2016 (G) July 2017 (G) July 2018
Pharmaceutical drug utilization	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A34 (G34) How many different prescription medications are you currently taking? A35 (G35) How many different over-the-counter medications are you currently taking?	A34 (G34) > 0 or A35 (G35) > 0	(A) July 2016 (G) July 2017 (G) July 2018

Table A.16: Variable Definitions

Variable Name	Data Source	Survey Question(s)	Formula	Time Period
Physician/ER utilization	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A36 (G36) In the last 6 months, how many times did you go to a doctor?s office, clinic, emergency room, or other healthcare provider to get care for yourself? Do not include dental visits. Your best estimate is fine.	A36 (G36) != "None"	(A) July 2016 (G) July 2017 (G) July 2018
Hospital utilization	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A37 (G37) = In the last 6 months, how many different times were you a patient in a hospital at least overnight? Do not include hospital stays to deliver a baby. Your best estimate is fine.	A37 (G37) != "None"	(A) July 2016 (G) July 2017 (G) July 2018
Any sick days in past year	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A45 (G46) In the last 12 months, about how many days of work have you missed because of disability or poor health? Your best estimate is fine.	A45 (G46) != 0	(A) July 2016 (G) July 2017 (G) July 2018
Worked 50+ hours/week	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A44 (G45) About how many hours a week do you usually work at your current job or jobs?	A44 (G45) = "50 or more"	(A) July 2016 (G) July 2017 (G) July 2018
Very satisfied with job	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A46 (G53) How satisfied are you with your current job?	A46 (G53) = "Very satisfied"	(A) July 2016 (G) July 2017 (G) July 2018
Very or somewhat satisfied with job	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A46 (G53) How satisfied are you with your current job?	A46 (G53) = "Very satisfied" or "Somewhat satisfied"	(A) July 2016 (G) July 2017 (G) July 2018
Management priority on health/safety	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G)	A52 (G62) How much of a priority do you think your unit's management places on the health and safety of workers?	A52 (G62) = "Very high priority" or "Some priority"	(A) July 2016 (G) July 2017 (G) July 2018
Happier at work than last year	2017 Online survey (G) 2018 Online survey (G)	G54 Do you feel happier at work this year than you did last year?	G54 = Yes	(G) July 2017 (G) July 2018
Presenteeism	2017 Online survey (G) 2018 Online survey (G)	G47 Despite having disability or poor health, I was able to finish hard tasks in my work. G48 At work, I was able to focus on achieving my goals despite disability or poor health. G49 Despite having disability or poor health, I felt energetic enough to complete all my work. G50 Because of disability or poor health, the stresses of my job were much harder to handle. G51 My disability or poor health distracted me from taking pleasure in my work. G52 I felt hopeless about finishing certain work tasks, due to my disability or poor health.	Stanford Presenteeim Scale (SPS-6), using G47-G52	(G) July 2017 (G) July 2018

Table A.16: Variable Definitions

Variable Name	Data Source	Survey Question(s)	Formula	Time Period
Feel very productive at work	2017 Online survey (G) 2018 Online survey (G)	G56 How productive do you feel at work?	G56 = "Very productive"	(G) July 2017 (G) July 2018
Received promotion	2017 Online survey (G) 2018 Online survey (G)	G57 During the last 12 months, have you been given a promotion or more responsibility at work?	G57 = "Yes"	(G) July 2017 (G) July 2018
Job search very likely	2017 Online survey (G) 2018 Online survey (G)	G64 Taking everything into consideration, how likely are you to make a genuine effort to find a job with a new employer (outside the university) within the next year?	G64 = "Very likely"	(G) July 2017 (G) July 2018
Job search somewhat / very likely	2017 Online survey (G) 2018 Online survey (G)	G64 Taking everything into consideration, how likely are you to make a genuine effort to find a job with a new employer (outside the university) within the next year?	G64 = "Very likely" or "Somewhat likely"	(G) July 2017 (G) July 2018
Productivity index	2016 Online survey (A) 2017 Online survey (G) 2018 Online survey (G) Human resources data (C)	All productivity-related questions described above.	First principle component of all productivity-related measures listed in this table	(A) July 2016 (G) July 2017 (G) July 2018 (C) May 30, 2016 (C) August 15, 2017 (C) January 31, 2019
Total spending (dollars/month)	Health Insurance Claims Data (B)	N/A	Monthly Average	Pre-period: 7/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19
Drug spending	Health Insurance Claims Data (B)	N/A	Monthly Average	Pre-period: 7/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19
Office spending	Health Insurance Claims Data (B)	N/A	Monthly Average	Pre-period: 7/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19
Hospital spending	Health Insurance Claims Data (B)	N/A	Monthly Average	Pre-period: 7/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19

Table A.16: Variable Definitions

Variable Name	**Data Source**	**Survey Question(s)**	**Formula**	**Time Period**
Non-zero medical spending	Health Insurance Claims Data (B)	N/A	Monthly Average	Pre-period: 7/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19
IL Marathon/10K/5K	Human Resources Data (C)	N/A	Pre-period: participated in *at least one* event during 2014 - 2016	Pre-period: April 2014 - April 2016 Post-periods: April 2017 April 2018
Campus gym visits (days/year)	Human Resources Data (C)	N/A	Number of visits to gym, measured by ID card swipe-in	Pre-period: 7/1/15 - 7/31/16 Post-periods: 8/1/16 - 7/31/17 8/1/16 - 1/31/19

Notes: Variable definitions are based on our pre-analysis plan, which is available at http://www.socialscienceregistry.org/trials/1368.

Appendix B: Comparison With Prior Literature — Further Details

We compiled all treatment effects estimates for health care costs and absenteeism from the studies included in the following review articles on wellness programs: Baicker, Cutler and Song (2010), Soler et al. (2010), Osilla et al. (2012), Lerner et al. (2013), and Baxter et al. (2014). There are two additional articles included below that are not featured in these review articles: Moore, LoGerfo and Inui (1980) and Bernacki, Tao and Yuspeh (2006). For each study, we identify the outcome of interest, i.e. health care costs (HCC) or absenteeism (ABS). We also indicate whether the study estimated a treatment-on-the-treated (TOT) or an intent-to-treat (ITT) effect.

If a study includes only a treatment and control group, we report the levels for each, T_1 and C_1, respectively. We use the level for the control group as the counterfactual level (CF Level). We then calculate the effect as $T_1 - C_1$, and the percent change as the effect divided by the counterfactual level.

Some studies also include pre and post levels for the treatment and control, T_0 and C_0, respectively. In those cases, we calculate the effect as $(T_1 - T_0) - (C_1 - C_0)$, and the counterfactual level as T_1 minus the effect. The percent change is still calculated as the effect divided by the counterfactual level.

Finally, some studies only include pre and post levels for the treatment group. In those cases, the effect is calculated as $T_1 - T_0$, the counterfactual level is T_0, and the percent change is again the effect divided by the counterfactual level.

For Entries with a "+" mark, we have taken the results as directly reported in an appendix table from Baicker, Cutler and Song (2010).

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Aldana et al. (1993)	HCC	2,148	1,800	1,480	1,368	2,036	-236	-0.12	TOT
Aldana et al. (2005)	HCC		2,666.07		2,621	2,621	45.07	0.02	TOT
Aldana et al. (2005)	ABS		14.71		15.40	15.40	-0.69	-0.04	TOT
At'kov et al. (2011)	ABS		8.15		18.97	18.97	-10.82	-0.57	TOT
At'kov et al. (2011)	ABS		4.8		7.86	7.86	-3.06	-0.39	TOT
Baker et al. (2008)	HCC					4,090,978	-311,755	-0.08	TOT
Baun, Bemacki and Tsai (1986)	HCC		593.42		1,145.60	1,145.60	-552.18	-0.48	TOT
Baun, Bemacki and Tsai (1986)	ABS	34.87	36.10	34.89	41.23	41.20	-5.1	-0.12	TOT
Bernacki, Tao and Yuspeh (2005)	HCC		3,868		7,875	7,875	-4007	-0.51	TOT
Bernacki, Tao and Yuspeh (2005)	ABS		53.4		95.0	95.0	-41.6	-0.44	TOT
Bernacki, Tao and Yuspeh (2006)	HCC		5,855		9,850	9,850	-3,995	-0.41	TOT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Bernacki, Tao and Yuspeh (2006)	ABS		53.0		99.0	99.0	-46.0	-0.46	TOT
Bertera (1990)	ABS	5.7	4.9	5.2	4.9	5.4	-0.5	-0.09	ITT
Bertera (1993)	ABS		3.0		2.9	2.9	0.1	0.03	ITT
Blair et al. (1986)$^{+}$	ABS	5.6	5.5	6.0	6.2	5.8	-0.3	-0.05	TOT
Bly, Jones and Richardson (1986)$^{+}$	HCC	247	655	253	1,234	1,228	-573	-0.47	ITT
Bridges et al. (2000) (1997–1998)	HCC		26.18		10.51	10.51	15.67	1.49	TOT
Bridges et al. (2000) (1997–1998)	ABS		0.60		0.41	0.41	0.19	0.45	TOT
Bridges et al. (2000) (1998–1999)	HCC		6.22		9.71	9.71	-3.49	-0.36	TOT
Bridges et al. (2000) (1998–1999)	ABS		0.18		0.24	0.24	-0.06	-0.26	TOT
Bunting and Cranor (2006)	HCC		2,334		3,046	3,046	-709.27	-0.23	TOT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Bunting and Cranor (2006)	ABS	86.50	20.80			86.50	-65.70	-0.76	TOT
Burton and Conti (2000)	ABS	29.3	23.2	22	23.3	30.60	-7.40	-0.24	ITT
Burton et al. (2005)	ABS		1.86		3.15	3.15	-1.29	-0.41	TOT
Campbell and Rumley (1997)	HCC		1,181		2,990	2,990	-1809	-0.61	TOT
Campbell and Rumley (1997)	ABS		50		109	109	-59	-0.54	TOT
Chenoweth et al. (2005)	HCC		1,351		1,580	1,580	-229	-0.14	TOT
Chenoweth et al. (2008)	HCC		4,484.66		5,359.66	5,360	-875.00	-0.16	TOT
Colombo et al. (2006)	ABS		294.2		366.82	366.82	-72.62	-0.20	TOT
Colombo et al. (2006)	ABS		161		231	231	-70	-0.30	TOT
Cousins and Liu (2003)	HCC		5,264		5,825	5,825	-561	-0.10	ITT
Davis et al. (2009)	HCC	24.6	-4.4	10.4	6.0	100	-24.60	-0.25	ITT
Davis et al. (2009)	ABS		7.6		10.1	10.1	-2.5	-0.25	ITT
Dille (1999)	HCC		946.27		6,518.32	6,518.32	-5,572.04	-0.85	TOT
Dille (1999)	ABS		35		63	63	-28	-0.44	TOT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Fera, Bluml and Ellis (2009)	HCC		13,829		14,909	14,909	-1080	-0.07	TOT
Foote and Erfurt (1991) (1)	HCC	765	951	721	1,021	1,065	-114	-0.11	ITT
Foote and Erfurt (1991) (2)	HCC	616	811	721	1,021	916	-105	-0.11	ITT
Foote and Erfurt (1991) (3)	HCC	448	516	721	1,021	748	-232	-0.31	ITT
Fries et al. (1994)	HCC	1,376	1,730	1,188	1,685	1,873	-143	-0.08	ITT
Fries et al. (1994)	ABS		4.30		5.50	5.50	-1.20	-0.22	ITT
Fries and McShane (1998)	HCC	1,138	834	632	567	1,075	-241	-0.22	TOT
Fries and McShane (1998)	ABS	3.85	2.95	1.8	1.6	3.66	-0.71	-0.19	TOT
Gibbs et al. (1985)	HCC	97.37	227.38	84.52	297.73	311.03	-83.20	-0.27	TOT
Goetzel et al. (1998)	HCC		1,053		1,041	1,041	12	0.01	TOT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Green-McKenzie et al. (2002)	HCC		191,992		469,694	469,694	-277,702	-0.59	TOT
Groeneveld et al. (2011)	HCC		212		279	279	-67	-0.24	ITT
Groeneveld et al. (2011)	ACC		12.3		9.1	9.1	3.2	0.35	ITT
Groeneveld et al. (2011) (imputed)	ACC		14.4		15.7	15.7	-1.3	-0.08	ITT
Henke et al. (2011)	HCC		3,835		4,400	4,400	-565	-0.13	ITT
Herman et al. (2006)	ABS	0.052	0.051	0.065	0.077	0.06	-0.01	-0.20	TOT
Hochart and Lang (2011)	HCC	225.74	227.77	226.75	276.01	275.0	-47.23	-0.17	ITT
Hughes et al. (2007)	HCC		1,970		4,353	4,353	-2,383	-0.55	TOT
Hughes et al. (2007)	ABS		1.1		3.1	3.1	-2.0	-0.65	TOT
Ichihashi, Muto and Shibuya (2007)	HCC		586.57		645.82	645.82	-59.25	-0.09	TOT
Jeffery et al. (1993)	ABS	18.0	13.5	19.1	18.2	18.0	-3.6	-0.2	ITT
Jones, Bly and Richardson (1990)	ABS	43.19	46.63	33.33	43.39	53.25	-6.62	-0.12	ITT
Knight et al. (1994)	ABS	9.1	10.2	9.1	10.8	10.8	-0.6	-0.06	TOT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Lechner and de Vries (1997)	ABS	10.17	5.40	13.75	13.65	10.06	-4.66	-0.46	TOT
Leigh et al. (1992)$^{+}$	HCC	2,171	1,695	1,881	1,995	2,285	-590	-0.26	ITT
Leigh et al. (1992)	ABS	18.0	17.2	18.0	19.4	19.4	-2.2	-0.11	ITT
Linz et al. (2001)	ABS		5.11		14.0	14.0	-8.89	-0.64	TOT
Loeppke et al. (2008)	ABS		9.83		5.75	5.75	4.08	0.71	ITT
Lynch et al. (1990)	ABS	4.40	3.70	5.57	5.49	4.32	-0.62	-0.14	TOT
Maes et al. (1998)	ABS	0.158	0.077	0.143	0.095	0.11	-0.03	-0.30	ITT
McCulloch et al. (2001)	ABS		56.4		73.5	73.5	-17.1	-0.23	TOT
McEachan et al. (2011)	HCC		-17,900.0		-17,979.4	-17,979.4	79.4	0.04	ITT
Merrill et al. (2011)	HCC		2,838.0		4,806.6	4,806.6	-1,968.6.0	-0.41	TOT
Milani and Lavie (2009)	HCC	2,960	1,539	3,002	2,522	2,480	-941	-0.38	ITT
Mills et al. (2007)	ABS	0.38	0.35	0.58	0.76	0.56	-0.21	-0.38	TOT
Moore, LoGerfo and Inui (1980) (G1 vs G2)	HCC	7.8	6.2	7.0	5.9	6.70	-0.50	-0.07	ITT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Moore, LoGerfo and Inui (1980) (G1 vs G3)	HCC	7.9	6.0	7.0	5.9	6.70	-0.80	-0.12	ITT
Morales et al. (2004)	ABS		22.66		29.08	29.08	-6.42	-0.22	TOT
Musich, Adams and Edington (2000)	HCC	1,658	1,819	1,413	2,219	2,464	-647	-0.26	TOT
Naydeck et al. (2008)	HCC	1,531	2,907	1,427	3,429	3,533	-626	-0.18	TOT
Nilsson, Klasson and Nyberg (2001)	ABS	6.0	2.9	4.5	7.4	8.9	-6.0	-0.67	ITT
Nyman et al. (2012) (DM)	HCC	625.46	734.99	470.33	646.97	802.10	-67.11	-0.08	TOT
Nyman et al. (2012) (DM)	ABS	67.87	76.3	67.38	72.52	73.02	3.28	0.04	TOT
Nyman et al. (2012) (LM)	HCC	403.19	481.46	302.68	407.87	508.38	-26.93	-0.05	TOT
Nyman et al. (2012) (LM)	ABS	60.36	65.66	57.57	64.08	66.88	-1.22	-0.02	TOT
Osilla et al. (2010)	ABS		7.88		13.75	13.75	-5.87	-0.43	TOT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Ozminkowski et al. (1999)	HCC	170	212	180	257	247	-35	-0.14	TOT
Page et al. (2009)	HCC		169,780		105,220	105,220	64,560	0.61	TOT
Page et al. (2009)	ABS		600		800	800	-200	-0.25	TOT
Pegus et al. (2002)	ABS		0.33		0.49	0.49	-0.16	-0.32	ITT
Pelletier, Boles and Lynch (2004)	ABS		0.01		0.015	0.015	-0.005	-0.33	TOT
Proper et al. (2004)	ABS		3,745		4,505	4,505	-760	-0.17	ITT
Proper et al. (2004)	ABS	17.2	21.0	15.2	25.25	27.25	-6.25	-0.23	ITT
Ringen et al. (2002)	HCC		236		325	325	-89	-0.27	ITT
Sacks et al. (2009)	HCC		2,413		2,327.86	2,327.86	85.14	0.04	TOT
Sacks et al. (2009) (High CV risk subgroup)	HCC		3,425		4,251.95	4,251.95	-826.95	-0.19	TOT
Samad et al. (2006)	ABS		14.22		67.44	67.44	-53.22	-0.79	TOT
Samad et al. (2006)	ABS		3.0		4.22	4.22	-1.22	-0.29	TOT
Schneider and Häck (2011)	HCC		134,700		289,141	289,141	-154,441	-0.53	ITT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Schultz et al. (2002)	ABS	6.6	17.2	6.6	23.3	23.3	-6.1	-0.26	TOT
Sciacca et al. (1993)	HCC	314.50	523.20	224.00	400.00	490.50	32.70	0.07	TOT
Serxner et al. (2001)	ABS	29.2	27.8	33.2	38.1	34.1	-6.3	-0.18	TOT
Serxner et al. (2003)	HCC		3,130.33		3,397.00	3,397.00	-266.67	-0.08	TOT
Shephard et al. (1982)	HCC	294	296	295	396	395	-99	-0.25	ITT
Shi (1993) (G1 vs G2)	HCC	547.98	424.21	582.05	465.25	431.18	-6.97	-0.02	ITT
Shi (1993) (G1 vs G2)	ABS	4.96	4.69	5.05	4.78	4.69	0.0	0.0	ITT
Shi (1993) (G1 vs G3)	HCC	580.84	410.89	582.05	462.25	464.05	-53.15	-0.11	ITT
Shi (1993) (G1 vs G3)	ABS	5.15	4.08	5.05	4.78	4.88	-0.8	-0.16	ITT
Shi (1993) (G1 vs G4)	HCC	601.84	384.43	582.05	465.25	485.05	-100.62	-0.21	ITT
Shi (1993) (G1 vs G4)	ABS	5.22	3.24	5.05	4.78	4.95	-1.71	-0.35	ITT
Stave, Muchmore and Gardner (2003)	HCC		5,042.06		5,683.38	5,683.38	-641.32	-0.11	TOT
Stave, Muchmore and Gardner (2003)	ABS		2.3		3.32	3.32	-1.02	-0.31	TOT
Taimela et al. (2008)	HCC		925		1109	1109	-184	-0.17	ITT

Table B.1: Detailed Description of Estimates from Figure 6

Title(Year)	Outcome	T_0	T_1	C_0	C_1	CF Level	Effect	% Change	Type
Taimela et al. (2008)	HCC	17.4	19.3	17.1	29.9	30.2	-10.9	-0.36	ITT
Wang et al. (2007)	ABS		10.20		13.45	13.45	-3.25	-0.24	ITT
Wolf et al. (2009)	ABS	0.74	0.31	0.75	1.16	1.16	-0.85	-0.73	ITT
Wood, Olmstead and Craig (1989)	ABS	2.5	2.32	2.87	4.19	3.82	-1.50	-0.39	TOT
Golaszewski et al. (1992)	HCC	6,185	7,743	5,249	7,734	8,670	-927	-0.11	TOT

Prior Wellness Literature

Aldana, Steven G, Bert H Jacobson, Clifford J Harris, Patrick L Kelley, and William J Stone. 1993. "Influence of a mobile worksite health promotion program on health care costs." *American journal of preventive medicine*, 9(6): 378–383.

Aldana, Steven G, Ray M Merrill, Kristine Price, Aaron Hardy, and Ron Hager. 2005. "Financial impact of a comprehensive multisite workplace health promotion program." *Preventive medicine*, 40(2): 131–137. doi: 10.1016/j.ypmed.2004.05.008.

At'kov, O Yu, AV Azarov, DA Zhukov, N Nicoloyannis, and Laure Durand. 2011. "Influenza vaccination in healthy working adults in Russia." *Applied health economics and health policy*, 9(2): 89–99. doi: 10.2165/11538680-000000000-00000.

Baicker, Katherine, David Cutler, and Zirui Song. 2010. "Workplace wellness programs can generate savings." *Health Affairs*, 29(2): 304–311.

Baker, K.M., et al. 2008. "Using a return-on-investment estimation model to evaluate outcomes from on obesity management worksite health promotion program." *J Occup Environ Med*, 50: 981–990. doi: 10.1097/JOM.0b013e318184a489.

Baun, William B, Edward J Bemacki, and Shan P Tsai. 1986. "A preliminary investigation: effect of a corporate fitness program on absenteeism and health care cost." *Journal of Occupational and Environmental Medicine*, 28(1): 18–22. PMID: 3081697.

Baxter, Siyan, Kristy Sanderson, Alison J Venn, C Leigh Blizzard, and Andrew J Palmer. 2014. "The relationship between return on investment and quality of study methodology in workplace health promotion programs." *American Journal of Health Promotion*, 28(6): 347–363.

Bernacki, Edward J, Xuguang Grant Tao, and Larry Yuspeh. 2005. "A preliminary investigation of the effects of a provider network on costs and lost-time in workers' compensation." *Journal of occupational and environmental medicine*, 47(1): 3–10. PMID:15655406.

Bernacki, Edward J, Xuguang Grant Tao, and Larry Yuspeh. 2006. "An investigation of the effects of a healthcare provider network on costs and lost time in workers' compensation." *Journal of occupational and environmental medicine*, 48(9): 873–882.

Bertera, R. L. 1993. "Behavioral risk factor and illness day changes with workplace health promotion: two-year results." *American Journal of Health Promotion*, 7: 365–373. PMID: 10148712.

Bertera, Robert L. 1990. "The effects of workplace health promotion on absenteeism and employment costs in a large industrial population." *American journal of public health*, 80(9): 1101–1105. PMCID: PMC1404872.

Blair, Steven N, Mike Smith, Thomas R Collingwood, Roger Reynolds, Michael C Prentice, and Charles L Sterling. 1986. "Health promotion for educators: impact on absenteeism." *Preventive medicine*, 15(2): 166–175. PMID: 3714669.

Bly, Janet L, Robert C Jones, and Jean E Richardson. 1986. "Impact of worksite health promotion on health care costs and utilization: evaluation of Johnson & Johnson's Live for Life program." *JAMA*, 256(23): 3235–3240. doi:10.1001/jama.1986.03380230059026.

Bridges, Carolyn Buxton, William W Thompson, Martin I Meltzer, Gordon R Reeve, Walter J Talamonti, Nancy J Cox, Heather A Lilac, Henrietta Hall, Alexander Klimov, and Keiji Fukuda. 2000. "Effectiveness and cost-benefit of influenza vaccination of healthy working adults: a randomized controlled trial." *Jama*, 284(13): 1655–1663. doi:10.1001/jama.284.13.1655.

Bunting, Barry A, and Carole W Cranor. 2006. "The Asheville Project: long-term clinical, humanistic, and economic outcomes of a community-based medication therapy management program for asthma." *Journal of the American Pharmacists Association*, 46(2): 133–147. doi: 10.1331/154434506776180658.

Burton, Wayne N, and Daniel J Conti. 2000. "Disability management: corporate medical department management of employee health and productivity." *Journal of Occupational and Environmental Medicine*, 42(10): 1006–1012. PMID: 11039164.

Burton, Wayne N, Katherine T McCalister, Chin-Yu Chen, and Dee W Edington. 2005. "The association

of health status, worksite fitness center participation, and two measures of productivity." *Journal of Occupational and Environmental Medicine*, 47(4): 343–351. PMID: 15824625.

Campbell, Douglas S, and Maria H Rumley. 1997. "Cost-effectiveness of the influenza vaccine in a healthy, working-age population." *Journal of Occupational and Environmental Medicine*, 39(5): 408–414. PMID: 9172085.

Chenoweth, David Harlan, Nanette Martin, Jared Pankowski, and Lawrence W. Raymond. 2005. "A benefit-cost analysis of a worksite nurse practitioner program: first impressions." *Journal of occupational and environmental medicine*, 47 11: 1110–6.

Chenoweth, David, Nanette Martin, Jared Pankowski, and Lawrence W Raymond. 2008. "Nurse practitioner services: Three-year impact on health care costs." *Journal of occupational and environmental medicine*, 50(11): 1293–1298. doi: 10.1097/JOM.0b013e318184563a.

Colombo, Giorgio L, Antonio Ferro, Marta Vinci, Maria Zordan, and Giulio Serra. 2006. "Cost-benefit analysis of influenza vaccination in a public healthcare unit." *Therapeutics and clinical risk management*, 2(2): 219. PMID: 18360596.

Cousins, Michael S, and Ying Liu. 2003. "Cost savings for a preferred provider organization population with multi-condition disease management: evaluating program impact using predictive modeling with a control group." *Disease Management*, 6(4): 207–217. doi: 10.1089/109350703322682522.

Davis, L, K Loyo, A Glowka, R Schwertfeger, L Danielson, C Brea, et al. 2009. "A comprehensive worksite wellness program in Austin, Texas: Steps to a Healthier Austin and Capital Metropolitan Transportation Authority." *Prev Chronic Dis*, 6(2). PMID: 19289003.

Dille, JoAnne Hein. 1999. "A worksite influenza immunization program: impact on lost work days, health care utilization, and health care spending." *AAOHN Journal*, 47(7): 301–309. PMID: 10661043.

Fera, Toni, Benjamin M Bluml, and William M Ellis. 2009. "Diabetes Ten City Challenge: final economic and clinical results." *Journal of the American Pharmacists Association*, 49(3): 383–391. doi: 10.1331/JAPhA.2009.09015.

Foote, Andrea, and John C Erfurt. 1991. "The benefit to cost ratio of work-site blood pressure control programs." *JAMA*, 265(10): 1283–1286. doi: 10.1001/jama.1991.03460100085029.

Fries, James F, and Dennis McShane. 1998. "Reducing need and demand for medical services in high-risk persons. A health education approach." *Western Journal of Medicine*, 169(4): 201. PMID:9795579.

Fries, James F, Harry Harrington, Robert Edwards, Louis A Kent, and Nancy Richardson. 1994. "Randomized controlled trial of cost reductions from a health education program: the California Public Employees' Retirement System (PERS) study." *American Journal of Health Promotion*, 8(3): 216–223.

Gibbs, James O, Dallas Mulvaney, Carol Henes, and Roger W Reed. 1985. "Work-site health promotion: five-year trend in employee health care costs." *Journal of Occupational and Environmental Medicine*, 27(11): 826–830. PMID: 4067688.

Goetzel, Ron Z, Bert H Jacobson, Steven G Aldana, Kris Vardell, and Leslie Yee. 1998. "Health care costs of worksite health promotion participants and non-participants." *Journal of Occupational and Environmental Medicine*, 40(4): 341–346. PMID: 9571525.

Golaszewski, Thomas, David Snow, Wendy Lynch, Louis Yen, and Debra Solomita. 1992. "A benefit-to-cost analysis of a work-site health promotion program." *Journal of Occupational and Environmental Medicine*, 34(12): 1164–1172. doi: 10.1108/17538351011054998.

Green-McKenzie, Judith, Sharon Rainer, Amy Behrman, and Edward Emmett. 2002. "The effect of a health care management initiative on reducing workers' compensation costs." *Journal of occupational and environmental medicine*, 44(12): 1100–1105. PMID: 12500451.

Groeneveld, Iris F, Marieke F van Wier, Karin I Proper, Judith E Bosmans, Willem van Mechelen, and Allard J van der Beek. 2011. "Cost-effectiveness and cost-benefit of a lifestyle intervention for workers in the construction industry at risk for cardiovascular disease." *Journal of occupational and environmental medicine*, 53(6): 610–617. doi: 10.1097/JOM.0b013e31821b9c24.

Henke, Rachel M, Ron Z Goetzel, Janice McHugh, and Fik Isaac. 2011. "Recent experience in health

promotion at Johnson & Johnson: lower health spending, strong return on investment." *Health Affairs*, 30(3): 490–499. doi: 10.1377/hlthaff.2010.0806.

Herman, Christopher W, Shirley Musich, Chifung Lu, Stewart Sill, Joyce M Young, and Dee W Edington. 2006. "Effectiveness of an incentive-based online physical activity intervention on employee health status." *Journal of Occupational and Environmental Medicine*, 48(9): 889–895. doi: 10.1097/01.jom.0000232526.27103.71.

Hochart, Cindy, and Michelle Lang. 2011. "Impact of a comprehensive worksite wellness program on health risk, utilization, and health care costs." *Population health management*, 14(3): 111–116. doi: 10.1089/pop.2010.0009.

Hughes, M Courtney, Teresa M Girolami, Allen D Cheadle, Jeffrey R Harris, and Donald L Patrick. 2007. "A lifestyle-based weight management program delivered to employees: examination of health and economic outcomes." *Journal of occupational and environmental medicine*, 49(11): 1212–1217. doi: 10.1097/JOM.0b013e318159489d.

Ichihashi, Toru, Takashi Muto, and Koji Shibuya. 2007. "Cost-benefit analysis of a worksite oral-health promotion program." *Industrial health*, 45(1): 32–36. doi: 10.2486/indhealth.45.32.

Jeffery, Robert W, Jean L Forster, Bonny V Dunn, Simone A French, Paul G McGovern, and Harry A Lando. 1993. "Effects of work-site health promotion on illness-related absenteeism." *Journal of Occupational and Environmental Medicine*, 35(11): 1142–1146.

Jones, Robert C, Janet L Bly, and Jean E Richardson. 1990. "A study of a work site health promotion program and absenteeism." *Journal of Occupational and Environmental Medicine*, 32(2): 95–99.

Knight, Kevin K, Ron Z Goetzel, Jonathan E Fielding, Marvin Eisen, George W Jackson, Toby Y Kahr, Gayle M Kenny, Sally W Wade, and Shyun Duann. 1994. "An evaluation of Duke University's LIVE FOR LIFE health promotion program on changes in worker absenteeism." *Journal of Occupational and Environmental Medicine*, 36(5): 533–536.

Lechner, Lilian, and Hein de Vries. 1997. "Effects of an employee fitness program on reduced absenteeism." *Journal of occupational and environmental medicine*, 39(9): 827–831.

Leigh, J Paul, Nancy Richardson, Robert Beck, Clark Kerr, Harry Harrington, Charles L Parcell, and James F Fries. 1992. "Randomized controlled study of a retiree health promotion program: the Bank of America study." *Archives of Internal Medicine*, 152(6): 1201–1206.

Lerner, Debra, Angie Mae Rodday, Joshua T Cohen, and William H Rogers. 2013. "A systematic review of the evidence concerning the economic impact of employee-focused health promotion and wellness programs." *Journal of occupational and environmental medicine*, 55(2): 209–222.

Linz, Douglas H, Linda F Ford, Miriam J Nightingale, Pamela L Shannon, Jeffrey S Davin, Carol O Bradford, and Craig D Shepherd. 2001. "Care management of work injuries: results of a 1-year pilot outcome assurance program." *Journal of occupational and environmental medicine*, 43(11): 959–968.

Loeppke, Ron, Sean Nicholson, Michael Taitel, Matthew Sweeney, Vince Haufle, and Ronald C Kessler. 2008. "The impact of an integrated population health enhancement and disease management program on employee health risk, health conditions, and productivity." *Population health management*, 11(6): 287–296. doi: 10.1089/pop.2008.0006.

Lynch, Wendy D, Thomas J Golaszewski, Andrew F Clearie, David Snow, and Donald M Vickery. 1990. "Impact of a facility-based corporate fitness program on the number of absences from work due to illness." *Journal of Occupational and Environmental Medicine*, 32(1): 9–12. doi: 10.1097/00043764-199001000-00006.

Maes, Stan, Chris Verhoeven, France Kittel, and Hetty Scholten. 1998. "Effects of a Dutch work-site wellness-health program: the Brabantia Project." *American journal of public health*, 88(7): 1037–1041.

McCulloch, Joyce, Ronald J Ozminkowski, Brian Cuffel, Rodney L Dunn, William Goldman, Dolores Kelleher, and Andrea Comporato. 2001. "Analysis of a managed psychiatric disability program." *Journal of occupational and environmental medicine*, 43(2): 101–109.

McEachan, Rosemary RC, Rebecca J Lawton, Cath Jackson, Mark Conner, David M Meads, and Robert M West. 2011. "Testing a workplace physical activity intervention: a cluster randomized controlled trial." *International Journal of Behavioral Nutrition and Physical Activity*, 8(1): 29. doi: 10.1186/1479-5868-8-29.

Merrill, Ray M, Beverly Hyatt, Steven G Aldana, and Dan Kinnersley. 2011. "Lowering employee health care costs through the healthy lifestyle incentive program." *Journal of Public Health Management and Practice*, 17(3): 225–232. doi: 10.1097/PHH.0b013e3181f54128.

Milani, Richard V, and Carl J Lavie. 2009. "Impact of worksite wellness intervention on cardiac risk factors and one-year health care costs." *The American journal of cardiology*, 104(10): 1389–1392. doi: 10.1016/j.amjcard.2009.07.007.

Mills, Peter R, Ronald C Kessler, John Cooper, and Sean Sullivan. 2007. "Impact of a health promotion program on employee health risks and work productivity." *American Journal of Health Promotion*, 22(1): 45–53. doi: 10.4278/0890-1171-22.1.45.

Moore, Stephen H, James LoGerfo, and Thoma S Inui. 1980. "Effect of a self-care book on physician visits: a randomized trial." *JAMA*, 243(22): 2317–2320.

Morales, Alvaro, Maria M Martinez, Anne Tasset-Tisseau, Elena Rey, Florence Baron-Papillon, and Alain Follet. 2004. "Costs and benefits of influenza vaccination and work productivity in a Colombian company from the employer's perspective." *Value in Health*, 7(4): 433–441. doi: 10.1111/j.1524-4733.2004.74006.x.

Musich, Shirley A, Laura Adams, and Dee W Edington. 2000. "Effectiveness of health promotion programs in moderating medical costs in the USA." *Health Promotion International*, 15(1): 5–15. doi: 10.1093/heapro/15.1.5.

Naydeck, Barbara L, Janine A Pearson, Ronald J Ozminkowski, Brian T Day, and Ron Z Goetzel. 2008. "The impact of the highmark employee wellness programs on 4-year healthcare costs." *Journal of occupational and environmental medicine*, 50(2): 146–156. doi: 10.1097/JOM.0b013e3181617855.

Nilsson, Peter M, Eva-Birgitta Klasson, and Per Nyberg. 2001. "Life-style intervention at the worksite — reduction of cardiovascular risk factors in a randomized study." *Scandinavian journal of work, environment & health*, 57–62. PMID: 11266148.

Nyman, John A, Jean M Abraham, Molly Moore Jeffery, and Nathan A Barleen. 2012. "The effectiveness of a health promotion program after 3 years: evidence from the University of Minnesota." *Medical care*, 50(9): 772–778. doi: 10.1097/MLR.0b013e31825a8b1f.

Osilla, Karen Chan, Erin Dela Cruz, Jeremy NV Miles, Steven Zellmer, Katherine Watkins, Mary E Larimer, and G Alan Marlatt. 2010. "Exploring productivity outcomes from a brief intervention for at-risk drinking in an employee assistance program." *Addictive behaviors*, 35(3): 194–200. doi: 10.1016/j.addbeh.2009.10.001.

Osilla, Karen Chan, Kristin Van Busum, Christopher Schnyer, Jody Wozar Larkin, Christine Eibner, and Soeren Mattke. 2012. "Systematic review of the impact of worksite wellness programs." *The American journal of managed care*, 18(2): e68–81.

Ozminkowski, Ronald J, Rodney L Dunn, Ron Z Goetzel, Richard I Cantor, Jan Murnane, and Mary Harrison. 1999. "A return on investment evaluation of the Citibank, NA, Health Management Program." *American Journal of Health Promotion*, 14(1): 31–43. PMID: 10621522.

Page, Matthew J, L Clark Paramore, Dilesh Doshi, and Marcia FT Rupnow. 2009. "Evaluation of resource utilization and cost burden before and after an employer-based migraine education program." *Journal of occupational and environmental medicine*, 51(2): 213–220. doi: 10.1097/JOM.0b013e318192bcd1.

Pegus, Cheryl, Terry L Bazzarre, Jeffrey S Brown, and Joseph Menzin. 2002. "Effect of the Heart At Work program on awareness of risk factors, self-efficacy, and health behaviors." *Journal of Occupational and Environmental Medicine*, 44(3): 228–236. PMID: 11911024.

Pelletier, Barbara, Myde Boles, and Wendy Lynch. 2004. "Change in health risks and work productivity over time." *Journal of Occupational and Environmental Medicine*, 46(7): 746–754. PMID: 15247815.

Proper, Karin I, Martine C De Bruyne, Vincent H Hildebrandt, Allard J Van Der Beek, Willem Jan Meerding, and Willem Van Mechelen. 2004. "Costs, benefits and effectiveness of worksite physical activity counseling from the employer's perspective." *Scandinavian journal of work, environment & health*, 36–46. PMID: 15247815.

Ringen, Knut, Norman Anderson, Tim McAfee, Susan M Zbikowski, and Donald Fales. 2002. "Smok-

ing cessation in a blue-collar population: Results from an evidence-based pilot program." *American journal of industrial medicine*, 42(5): 367–377. doi: 10.1002/ajim.10129.

Sacks, Naomi, Howard Cabral, Lewis E Kazis, Kelli M Jarrett, Delia Vetter, Russell Richmond, and Thomas J Moore. 2009. "A web-based nutrition program reduces health care costs in employees with cardiac risk factors: before and after cost analysis." *Journal of Medical Internet Research*, 11(4). doi: 10.2196/jmir.1263.

Samad, Abu H, Mohd HBHJ Usul, Dalilah Zakaria, Raman Ismail, Anne Tasset-Tisseau, Florence Baron-Papillon, and Alain Follet. 2006. "Workplace vaccination against influenza in Malaysia: does the employer benefit?" *Journal of occupational health*, 48(1): 1–10.

Schneider, M, and HJ Häck. 2011. "Screening for colorectal cancer: a cost benefit analysis on a health prevention programme at the Boehringer Ingelheim Company." *Deutsche medizinische Wochenschrift (1946)*, 136(20): 1047–1052. doi: 10.1055/s-0031-1275840.

Schultz, Alyssa B, Chifung Lu, Tracey E Barnett, Louis Tze-ching Yen, Timothy McDonald, David Hirschland, and Dee W Edington. 2002. "Influence of participation in a worksite health-promotion program on disability days." *Journal of Occupational and Environmental Medicine*, 44(8): 776–780. PMID: 12185799.

Sciacca, John, Roger Seehafer, Roger Reed, and Dallas Mulvaney. 1993. "The impact of participation in health promotion on medical costs: a reconsideration of the Blue Cross and Blue Shield of Indiana study." *American Journal of Health Promotion*, 7(5): 374–395. PMID: 10148713.

Serxner, Seth A, Daniel B Gold, Jessica J Grossmeier, and David R Anderson. 2003. "The Relationship Between Health Promotion Program Participation and Medical Costs:: A Dose Response." *Journal of Occupational and Environmental Medicine*, 45(11): 1196–1200. doi: 10.1097/01.jom.0000095002.12772.6a.

Serxner, Seth, Daniel Gold, David Anderson, and David Williams. 2001. "The impact of a worksite health promotion program on short-term disability usage." *Journal of Occupational and Environmental Medicine*, 43(1): 25–29.

Shephard, Roy J, PAUL Corey, PETER Renzland, and MICHAEL Cox. 1982. "The influence of an employee fitness and lifestyle modification program upon medical care costs." *Canadian journal of public health= Revue canadienne de sante publique*, 73(4): 259–263.

Shi, Leiyu. 1993. "Health promotion, medical care use, and costs in a sample of worksite employees." *Evaluation Review*, 17(5): 475–487. doi: 10.1177/0193841X9301700501.

Soler, Robin E, Kimberly D Leeks, Sima Razi, David P Hopkins, Matt Griffith, Adam Aten, Sajal K Chattopadhyay, Susan C Smith, Nancy Habarta, Ron Z Goetzel, et al. 2010. "A systematic review of selected interventions for worksite health promotion: the assessment of health risks with feedback." *American journal of preventive medicine*, 38(2): S237–S262.

Stave, Gregg M, Lamont Muchmore, and Harold Gardner. 2003. "Quantifiable impact of the contract for health and wellness: health behaviors, health care costs, disability, and workers' compensation." *Journal of Occupational and Environmental Medicine*, 45(2): 109–117.

Taimela, Simo, Selina Justen, Pasi Aronen, Harri Sintonen, Esa Läärä, Antti Malmivaara, Jaakko Tiekso, and Timo Aro. 2008. "An occupational health intervention programme for workers at high risk for sickness absence. Cost effectiveness analysis based on a randomised controlled trial." *Occupational and environmental medicine*, 65(4): 242–248. doi: 10.1136/oem.2007.033167.

Wang, Philip S, Gregory E Simon, Jerry Avorn, Francisca Azocar, Evette J Ludman, Joyce McCulloch, Maria Z Petukhova, and Ronald C Kessler. 2007. "Telephone screening, outreach, and care management for depressed workers and impact on clinical and work productivity outcomes: a randomized controlled trial." *Jama*, 298(12): 1401–1411. doi: 10.1001/jama.298.12.1401.

Wolf, Anne M, Mir S Siadaty, Jayne Q Crowther, Jerry L Nadler, Douglas L Wagner, Stephen L Cavalieri, Kurtis S Elward, and Viktor E Bovbjerg. 2009. "Impact of lifestyle intervention on lost productivity and disability: improving control with activity and nutrition (ICAN)." *Journal of occupational and environmental medicine/American College of Occupational and Environmental Medicine*, 51(2): 139. doi: 10.1097/JOM.0b013e3181965db5.

Wood, E Andrew, Gary W Olmstead, and James L Craig. 1989. "An evaluation of lifestyle risk factors and

absenteeism after two years in a worksite health promotion program." *American Journal of Health Promotion*, 4(2): 128–133. doi: 10.4278/0890-1171-4.2.128.

Appendix C: Multiple Hypothesis Testing Methodology

Multiple hypotheses arise when there are multiple outcomes of interest, multiple subgroups of interest, multiple independent variables of interest, or some combination thereof. Consider testing $K > 1$ different null hypotheses. The family-wise error rate (FWER) is the probability of rejecting at least one true null hypothesis (i.e., a "false discovery") belonging to this "family" of K hypotheses. A procedure is said to provide *strong* control of the FWER if it does not depend on which of the K null hypotheses happen to be true.

We estimate the FWER using the free step-down resampling method of Westfall and Young (1993) (Algorithm 2.8, p. 66-67). The procedure consists of the following steps:[1]

1. Estimate $\{\widehat{\beta}_1, \widehat{\beta}_2, ..., \widehat{\beta}_K\}$. Estimate the conventional, unadjusted p-values $\{p_1, p_2, ..., p_K\}$ that correspond to separately testing each null hypothesis $\widehat{\beta}_k = 0$. Without loss of generality, assume the estimated p-values are indexed such that $p_1 \leq p_2 \leq ... \leq p_K$.

2. Draw with replacement from the dataset to create a bootstrap sample.

   (a) Estimate $\{\widehat{\beta}^*_{i1}, \widehat{\beta}^*_{i2}, ..., \widehat{\beta}^*_{iK}\}$. Estimate the conventional, unadjusted p-values $\{p^*_{i1}, p^*_{i2}, ..., p^*_{iK}\}$ that correspond to separately testing each null hypothesis $\widehat{\beta}^*_{ik} = \widehat{\beta}_k$. The k index here corresponds to the ranking computed in step 1. It will *not* generally be the case that $p^*_{i1} \leq p^*_{i2} \leq ... \leq p^*_{iK}$.

   (b) Enforce monotonicity with respect to the original ordering in step 1 by computing the successive minima:

[1] Our program was written in Stata and is easily applied to other settings. The module can be obtained by typing "`ssc install wyoung, replace`" at the Stata prompt, or downloaded directly from ideas.repec.org/c/boc/bocode/s458440.html. The latest developer's version is available on GitHub at www.github.com/reifjulian/wyoung.

$$
\begin{aligned}
q^*_{iK} &= p^*_{iK} \\
q^*_{i,K-1} &= \min(q^*_{iK}, p^*_{i,K-1}) \\
q^*_{i,K-2} &= \min(q^*_{i,K-1}, p^*_{i,K-2}) \\
&\vdots \\
q^*_{i1} &= \min(q^*_{i2}, p^*_{i1})
\end{aligned}
$$

3. Repeat step 2 N times. For each bootstrap sample i and hypothesis k, define the indicator $COUNT_{ik} = 1$ if $q^*_{ik} \leq p_k$ and 0 otherwise.[2]

4. For each hypothesis $k = 1, 2, ..., K$, calculate the fraction of successive minima that were lower than the original p-value:

$$r_k = \frac{1}{N} \sum_{i=1}^{N} COUNT_{ik}$$

5. Enforce monotonicity using successive maximization to calculate the adjusted p-value:

$$
\begin{aligned}
p^{adj}_1 &= r_1 \\
p^{adj}_2 &= \max(r_1, r_2) \\
&\vdots \\
p^{adj}_K &= \max(r_{K-1}, r_K)
\end{aligned}
$$

This resampling algorithm exhibits strong control of the FWER under subset pivotality, which is a multivariate generalization of pivotality.[3] This condition requires that the mul-

[2]To compute "single-step" p-values instead of "step-down" p-values, define the indicator $COUNT_{ik} = 1$ if $\min\{p^*_{i1}, p^*_{i2}, ..., p^*_{iK}\} < p_k$ and 0 otherwise. Resampling-based single-step methods often control family-wise type 3 (sign) error rates. Whether their step-down counterparts also control type III error rates is unknown (Westfall and Young, 1993, p. 51).

[3]The sampling distribution of a pivotal statistic does not depend upon which distribution generated the data. The t-statistic is a common example.

tivariate distribution of any subvector of p-values is unaffected by the truth or falsehood of hypotheses corresponding to p-values not included in the subvector. The condition is satisfied in many settings, including testing the significance of coefficients in a general multivariate regression model with possibly non-normal or heteroskedastic errors (Westfall and Young, 1993, p. 122-123).

It is possible for this algorithm to produce adjusted p-values that are smaller than unadjusted p-values. For example, consider the extreme case where the number of bootstraps is equal to 1 (so that $N = 1$ in steps 3 and 4). Then all adjusted p-values are equal to either 0 or 1. The ones that are equal to 0 will of course be smaller than the unadjusted values. For this reason, we recommend employing a large number of bootstraps. (Westfall and Young (1993) recommend at least 10,000 bootstrap draws.) If adjusted p-values remain significantly smaller than the unadjusted p-values, even when the number of bootstraps is large, this may indicate model misspecification. For example, in simulations with clustered errors (described below), we found that adjusted p-values are frequently smaller than unadjusted values when we fail to employ a cluster bootstrap.

We ran four different sets of simulations to evaluate the effectiveness and statistical power of this resampling algorithm. Let μ be a 10-dimensional zero vector $(0, 0, ..., 0)'$. Let I be a 10×10 identity matrix. Let Σ be a 10×10 covariance matrix where all off-diagonal elements are equal to 0.9. The data generating process for each simulation scenario is described below:

1. Normal i.i.d. errors (10 outcomes)

   $e \sim \mathcal{N}(\mu, I)$

   $Y = e$

2. Normal i.i.d. errors (1 outcome, 10 subgroups)

   $e \sim \mathcal{N}(0, 1)$

   $Y = e$

3. Correlated errors (10 outcomes)

   $X \sim \mathcal{N}(\mu, I)$

   $e \sim \mathcal{N}(\mu, \Sigma)$

   $Y = 0.2X + e$

4. Lognormal, mean-zero i.i.d. errors (10 outcomes)[4]

   $e \sim \exp[\mathcal{N}(\mu, I)] - \sqrt{\exp[1]}$

   $Y = e$

We simulated 2,000 datasets for each of these four data generating processes. In each of these 2,000 simulations, we estimated a series of 10 regressions:

$$Y_i = \alpha + \beta_i X_i + \varepsilon_i, i = 1...10$$

The sample size for each regression was 100. The regressor $X_i \sim N(0, 1)$ in simulations 1, 2, and 3. In scenario 4, the regressor is just a constant equal to 1 (α is omitted). There are 10 null hypotheses that correspond to these 10 regressions: $\beta_i = 0, i = 1, ..., 10$. These 10 null hypotheses are all true in scenarios 1, 2, and 4, and all false in scenario 3 (correlated errors).

Table C.1 compares the effectiveness of the Westfall-Young resampling algorithm to other well-known multiple inference adjustment methods.[5] Each column in the table reports how often at least one null hypothesis was rejected using each adjustment method. When outcomes are independent and normally distributed, the probability that at least one of the 10 hypotheses is statistically significant is equal to $1 - (1 - .05)^{10} = 0.401$. This calculation accords well with the simulation: the first row of column (1) reports that at least one of the

[4] The mean of the standard lognormal distribution is $\sqrt{\exp[1]}$.

[5] The Bonferroni-Holm and Sidak-Holm (step-down) p-values are calculated as follows. Sort the K unadjusted p-values so that $p_1 \leq p_2 \leq ... \leq p_K$. The Bonferroni-Holm adjusted p-values are calculated as $\{p_1 K, \max[p_1, p_2(K-1)], ..., \max[p_{K-1}, p_K]\}$. The Sidak-Holm adjusted p-values are calculated as $\{1-(1-p_1)^K, \max[p_1, 1-(1-p_2)^{(K-1)}], ..., \max[p_{K-1}, p_K]\}$. If the calculation yields a value larger than 1, then the adjusted p-value is set equal to 1.

10 hypotheses was rejected at $\alpha = 0.05$ in 39.8 percent of the 2,000 simulations when no adjustment was performed. By contrast, the Bonferroni-Holm, Sidak-Holm, and Westfall-Young adjustments reject at least one null hypothesis only about 4 percent of the time, thus achieving a family-wise error rate of less than 5 percent.

In column (2), the 10 hypotheses arise from examining multiple subgroups rather than multiple outcome variables. Failing to adjust the p-values again results in a high rejection rate of nearly 40 percent. The Bonferroni-Holm, Sidak-Holm, and Westfall-Young adjustment methods, however, all achieve rejection rates of around 5 percent.

The downside of the Bonferroni-Holm and Sidak-Holm adjustment methods is that they assume outcomes are independent, and therefore can be too conservative when outcomes are correlated. This is demonstrated in column (3), which reports rejection rates for a scenario where the 10 null hypotheses are all *false*. Here, the Bonferroni-Holm and Sidak-Holm methods reject at least one hypothesis only about 35 percent of the time. The Westfall-Young resampling algorithm, however, achieves a rejection rate in excess of 50 percent.

Although traditional adjustment methods such as Bonferroni-Holm and Sidak-Holm are generally thought to be conservative, Westfall and Young (1993) emphasize that these traditional methods can actually *over-reject* when the data-generating process is nonnormal. This is demonstrated in column (4): the resampling method of Westfall-Young achieves a family-wise error rate of under 6 percent, but the Bonferroni-Holm and Sidak-Holm methods reject at least one null hypothesis over 20 percent of the time.

Clustered standard errors

Westfall and Young (1993) do not discuss how to perform multiple inference in regression models where observations can be grouped into clusters, with model errors correlated within clusters. The presence of clustered errors does not violate subset pivotality, which is automatically satisfied in linear regression models. However, in this case it is important that the resampling in step 2 of the procedure be done over entire clusters, rather than individual observations. This is accomplished by specifying the **cluster()** option of the **wyoung**

command.

We demonstrate the importance of resampling over clusters by performing another set of simulations. Again, let μ be a 10-dimensional zero vector $(0, 0, ..., 0)'$, and let I be a 10×10 identity matrix. The data generating process for this simulation scenario is:

5. Serially correlated errors (10 outcomes)

   $i = 1...100$ clusters

   $t = 1...10$ time periods

   $\eta_i \sim \mathcal{N}(\mu, I)$

   $e_{it} \sim \mathcal{N}(\mu, I)$

   $Y_{it} = \eta_i + e_{it}$

We again simulated 2,000 datasets. In each simulation, we estimated the following 10 regressions:

$$Y_{it} = \alpha + \beta_i D_{it} + \varepsilon_{it}, i = 1...10$$

where the dummy variable $D_{it} = 1\{t > START_i\}$ and $START_i$ is a Poisson random variable with mean equal to 5. We estimated these regressions under two different assumptions about the standard errors (homoskedastic or clustered), and with and without a bootstrap cluster. Our results are reported in Table C.2.

Comparing column (2) to column (1) in the first row of Table C.2 shows that estimating the model using clustered standard errors results in a smaller family-wise error rate relative to a model that assumes errors are homoskedastic. Nevertheless, the rejection rate for the unadjusted value in column (2) still significantly exceeds five percent because this specification does not account for the number of hypotheses being tested.[6]

The second and third rows of Table C.2 show that the Bonferroni-Holm and Sidak-Holm corrections achieve a 5 percent rejection rate when the standard errors are clustered. This

[6]By construction, the values in columns (2) and (3) are identical in the first three rows, because these two columns vary only the bootstrapping methodology, which matters only for the Westfall-Young correction.

is unsurprising since the outcome variables in this simulation are independent.

The fourth row of Table C.2 demonstrates the importance of properly accounting for clustered standard errors when implementing the Westfall-Young correction. Column (2) shows that (erroneously) employing a simple bootstrap that resamples over individual observations causes the Westfall-Young correction to perform worse than even the unadjusted specification! However, column (3) shows that the Westfall-Young correction achieves a five percent rejection rate when the cluster bootstrap is employed.

References

Westfall, Peter H, and S Stanley Young. 1993. *Resampling-based multiple testing: Examples and methods for p-value adjustment.* Vol. 279, John Wiley & Sons.

Table C.1: Family-wise rejection proportions at $\alpha = 0.05$

	(1)	(2)	(3)	(4)
Adjustment method	Normal errors	Multiple subgroups	Correlated errors	Lognormal errors
Unadjusted	0.398	0.387	0.685	0.577
Bonferroni-Holm	0.040	0.047	0.344	0.234
Sidak-Holm	0.040	0.051	0.347	0.237
Westfall-Young	0.041	0.045	0.513	0.058
Num. observations	100	100	100	100
Num. hypotheses	10	10	10	10
Hypotheses are true	Y	Y	N	Y

Notes: Table reports the fraction of 2,000 simulations where at least one null hypothesis in a family of 10 hypotheses was rejected. All hypotheses are true for the simulations reported in columns (1), (2), and (4), i.e., lower rejection rates are better. All hypotheses are false for the simulation reported in column (3), i.e., higher rejection rates are better. The Westfall-Young correction is performed using 1,000 bootstraps.

Table C.2: Family-wise rejection proportions at $\alpha = 0.05$, when the data generating process is serially correlated

	(1)	(2)	(3)
Unadjusted	0.652	0.401	0.401
Bonferroni-Holm	0.187	0.049	0.049
Sidak-Holm	0.188	0.049	0.049
Westfall-Young	0.191	0.498	0.046
Num. observations	1,000	1,000	1,000
Num. hypotheses	10	10	10
Model std. errors	Homoskedastic	Clustered	Clustered
Cluster bootstrap	N	N	Y

Notes: Table reports the fraction of 2,000 simulations where at least one null hypothesis in a family of 10 hypotheses was rejected. The difference between columns (1) and (2) is the assumption about the standard errors (homoskedastic or clustered). The difference between columns (2) and (3) is the method of bootstrapping (resampling over individual observations versus clusters), which matters only for the Westfall-Young correction. All null hypotheses are true, i.e., lower rejection rates are better. Each simulation generated 100 panels (clusters) with 10 time periods. The Westfall-Young correction is performed using 1,000 bootstraps.

Appendix D: Details of the Illinois Workplace Wellness Study

Table of Contents

D.1 Sample Selection and Study Overview

We designed and implemented a randomized controlled trial of an employee wellness program called iThrive at the University of Illinois at Urbana-Champaign. To participate in the study, university employees had to first digitally sign an informed consent form and complete an online baseline survey (described below). Employees who completed the baseline survey received a $30 Amazon.com gift card. Participants were subsequently randomly assigned either to a control group or to one of six different treatment groups. Treatment groups differed only in the amount of financial rewards that participants were offered: $0, $100, or $200 for completing a health screening and online health risk assessment, and $25 or $75 for each completed round of wellness activities. Treatment group participants were informed of their reward amounts at the time of their assignment.

Contact with members of the control group was minimized whenever possible. Participants in the control group were aware that they were participating in a study exploring "the link between wellness program incentives and program participation and health outcomes among employees", as stated in their informed consent form, but the details of the program and the size of the incentives for those in the treatment group was not revealed to them. Nevertheless, it is likely that many members of the control group were aware that others on campus were participating in wellness activities and receiving rewards for doing so.

The 2016-2017 iThrive wellness program had three main components:

1. Health screening (August 15 – September 16)
2. Online health risk assessment (September 8 – October 4)
3. Wellness activities
   (a) Fall 2016 (October 10 – December 16)
   (b) Spring 2017 (January 31 – April 25)

Steps 1 and 2 were mandatory. Participants who failed to complete them received no rewards and were not allowed to participate in subsequent wellness activities. Participants who successfully completed steps

1 and 2 were given the opportunity to participate in fall and spring wellness activities. Participation in fall activities was not required in order to participate in the spring activities.

The 2017-2018 iThrive wellness program maintained the same structure as the 2016-2017 program, and then concluded with a final health screening:

1. 2017 health screening (August 21 – September 22)
2. 2017 online health risk assessment (August 21 – September 22)
3. Wellness activities
    (a) Fall 2017 (October 16 – December 15)
    (b) Spring 2018 (February 5 – April 26)
4. 2018 health screening (August 21 – September 22)

Appendix Figures D.1 and D.2 illustrate the experimental design of the Illinois Workplace Wellness Study. The control group was invited to complete the 2017 (12-month follow-up) and 2018 (24-month follow-up) health screenings and online surveys. The control group was not allowed to participate in the 2016 (baseline) health screening. In addition, the control group was never allowed to participate in any of the online health risk assessments or in any of the iThrive fall and spring wellness activities.

The relationship between the different datasets employed in our study is illustrated in Appendix Figure D.3. Because some of the steps in the study were required in order to continue participating (e.g., taking the baseline survey), the datasets collected in later periods are often only available for a strict subset of participants from previous periods. For example, 2016 health screening data are available for any treatment group member who completed wellness activity in the first year of the program, but some people who completed the 2016 health screening were ineligible to sign up for a wellness activity because they did not complete the 2016 HRA.

D.1.1 2016 online baseline survey (July 11 – July 31)

The University of Illinois provided us with a list of 12,486 active employees who met the following criteria as of June 10, 2016: (1) employed at the Urbana-Champaign campus (specifically, those with a University of Illinois System HR "District/Division" code of UIUC, as opposed to UIC or UIS); and (2) eligible for part-time or full-time employee benefits from the Illinois Department of Central Management Services. This list included first and last names, mailing addresses, and email addresses. We dropped records that did not include a university email. We also dropped members of the research team, their family members, and other individuals heavily involved in the study. Following these exclusions, we were left with a total of 12,459 employees.

We mailed a postcard (see Appendix Figure D.4) on July 6, 2016 to each of these 12,459 employees informing them that they would receive an invitation to participate in an online survey for the Illinois Workplace Wellness Study. We included the UIUC-affiliated members of the research team in this mailing and confirmed that the postcards were delivered by July 9, 2016. The Provost of UIUC sent an email on the morning of July 11 to these employees indicating the university's support for the study (see Appendix Figure D.5).

An email invitation (see Appendix Figure D.6) containing the link to the online baseline survey was sent to each of the 12,459 employees on the morning of July 11, shortly after the email from the Provost. Reminder emails were sent on July 19, July 27, and August 1 to employees who had not yet completed the survey. The survey closed at noon on August 1, at which point 4,834 employees had successfully completed it. Participants who completed the survey immediately received a confirmation email (see Appendix Figure D.7). They also received an electronic $30 Amazon.com gift card about one week after completing the survey (see Appendix Figure D.8).

D.1.2 2016 study randomization (August 1 – August 8)

We randomly assigned 3,300 of the 4,834 employees who completed the online baseline survey to one of six different iThrive treatment groups, denoted A25, A75, B25, B75, C25, and C75. Treatment groups differed only in the size of incentives offered for completing various steps of the iThrive program. Treated

individuals in groups beginning with the letter A, B, or C were offered \$0, \$100, or \$200, respectively, for completing the health screening and online health risk assessment portions of the experiment. The second part of the treatment group name, 25 or 75, indicates the reward amount offered for each round (spring and/or fall) of wellness activities the individual completed.

For randomization, the sample was stratified by six baseline, demographic "strata" variables: (1) employee class (faculty, academic staff, or civil service); (2) sex (male or female); (3) age, as of the baseline survey launch date of July 11, 2016 (≤ 36, $37-49$, or ≥ 50); (4) above or below median annual salary; (5) quartile of annual salary; and (6) race (white or nonwhite). To create the strata, we sequentially split the sample in the order listed above for these strata variables. At each step in this sequence, we would only split a cell by the next strata variable if doing so resulted in cell sizes of at least 20. This ensured that, for every stratum, at least 2 employees could be assigned to the control and each of the 6 treatment groups (i.e., $20 \cdot p_{A,B,C} \cdot p_{25,75} > 2$, where $p_{A,B,C} \cdot p_{25,75}$ is the proportion of each stratum assigned to each treatment arm, as described below). This stratification process resulted in 69 strata, with the sample size per stratum ranging from 20 to 251.

Within each stratum, a proportion $p_{A,B,C} = 1100/4834 \approx 0.228$ of employees were randomly selected to be offered one of the three levels of incentive tied to completing the screening and health risk assessment (\$0, \$100, and \$200). This randomization was done such that exactly 1,100 employees in total would be assigned to each of these three levels of screening incentive. Next, within each stratum and screening incentive level, a proportion $p_{25,75} = 0.5$ of employees were randomly selected to be offered each of the two levels of activity incentive (\$25 or \$75). This resulted in six treatment groups with the following sample sizes: A25 ($N = 551$), A75 ($N = 549$), B25 ($N = 552$), B75 ($N = 548$), C25 ($N = 551$), and C75 ($N = 549$).

D.1.3 2016 health screening (August 15 – September 16)

We sent email invitations on August 9, 2016 to the 3,300 participants randomly selected to participate in iThrive. This email informed them of their selection and their monetary rewards for completing the different parts of the iThrive program, and explained how to sign up for a health screening (see Appendix

Figure D.9). We also mailed postcards to these participants (Appendix Figure D.10) informing them of their selection. The postcards did not specify the monetary amounts and were delivered a few days after the initial email invitation. We sent reminder emails on August 12, August 23, and September 12 to participants who had not yet signed up for a health screening. Each of these participants was given login access to the iThrive website (see Appendix Figure D.11 and Appendix Figure D.12), which provided them with information about the iThrive program and reported on their progress throughout the year.

Health screenings were offered at 7 different locations on the UIUC campus, and also at Presence Covenant Medical Center, which is located about one mile away from the center of campus. A map displaying these locations is available in Appendix Figure D.13. Participants signed up for a date and time to receive their health screening using an online appointment scheduler (see Appendix Figure D.14).[1]

Appointments were available Monday through Saturday, from August 15th to September 16th, with the exception of Saturday, September 3 and Monday, September 5 (Labor Day). Appointment times were generally available from 6 AM until 10:50 AM. Only one campus location was available each day. The full schedule of appointment times and locations is displayed in Appendix Table D.1.

Participants who successfully signed up for an appointment received a confirmation email containing the date, time, and a link to a map of the location of their appointment. The online appointment scheduler sent participants an automated reminder email 24 hours prior to their appointment (see Appendix Figure D.15), and an automated text message if they had provided their cell phone number when making their appointment. We also sent participants a reminder email emphasizing that they should "not have anything to eat or drink (besides water) for 12 hours" before the health screening (see Appendix Figure D.16).

Upon showing up for their appointment, participants were asked to provide a form of identification, to sign a second informed consent form, and to complete a brief questionnaire (see Appendix Figure D.17) concerning their beliefs about their health status.[2] Participants then filled out the top half of a health screening form (Appendix Figure D.18) and were subsequently then directed to an open "station" where a

[1] A small number (<10) of participants showed up for a health screening without an appointment, but we were able to accommodate them.

[2] The ID was not a formal requirement, so in the small number of cases where participants did not have an ID, we allowed them to receive their health screening anyway. Fraud was not a concern because (1) participants had to make appointments online in their name prior to their arrival; and (2) all reward payments were made later in the study by direct deposit via University payroll.

clinician from Presence Covenant Medical Center measured their height, weight, waist circumference, and blood pressure. Next, they obtained blood chemistry measurements using the CardioChek Plus Analyzer, which is manufactured by PTS Diagnostics. This fingerstick measures cholesterol (total, HDL, and LDL), triglycerides, and glucose. All measures were recorded on the health screening form. At the end of the screening, a health coach reviewed the results with each individual participant in private. Depending on the measures, participants were sometimes recommended to make minor lifestyle changes or to seek medical attention. (See Appendix Figure D.19 for the guidelines employed by the health coach.) Recommendations were recorded on the health screening form. Upon departure, participants were given a carbon copy of their health screening form and a postcard reminding them to check their email for an invitation to take the online health risk assessment (Appendix Figure D.20). From start to finish, the entire health screening lasted on average for about 20 minutes.

D.1.4 2016 online health risk assessment (September 8 – October 4)

After completing their health screening, participants were invited over email to complete an online health risk assessment survey (Appendix Figure D.21). We sent reminder emails on September 21 and September 29 to participants who had not yet completed their online health risk assessment. After completing the survey, participants received a confirmation email from us within a few days.

The server hosting the survey became overloaded with requests on the first day of the survey (September 8), causing many participants to experience technical problems and to be unable to complete the survey. This was fixed within 24 hours, although a small number of participants continued to report difficulties taking the health risk assessment throughout the survey period. Nevertheless, 97 percent of participants who completed the health screening managed to complete the online health risk assessment, so these technical glitches do not appear to have caused major difficulties for participants.

D.1.5 2016 fall wellness activities (October 10 – December 16)

We sent email invitations for the Fall 2016 wellness activities on September 27 to participants who had successfully completed their online health risk assessment (Appendix Figure D.22).[3] Participants were able to sign up for activities immediately, but no activities began before October 10. Signups were done via the iThrive website. Appendix Table D.2 lists the different activities that were available. Most classes were filled to capacity. Nearly 80 percent of people who registered were signed up for HealthTrails, which had unlimited capacity.

Out of 1,848 people eligible to participate, 1,304 people signed up for a wellness activity, and 903 people successfully completed them. People who completed an activity received either $25 or $75, paid by direct deposit via University payroll, depending on which treatment group they had been assigned to.

D.1.6 2017 spring wellness activities (January 31 – April 25)

We sent email invitations for the Spring 2017 wellness activities on January 17 to participants who had successfully completed their online health risk assessment (Appendix Figure D.23). Participants did not have to complete a fall activity to be eligible to participate in a spring activity. Participants were able to sign up for activities immediately, and activities began on January 31. Signups were done via the iThrive website. Appendix Table D.3 lists the different activities that were available. Most classes were filled to capacity. Over 75 percent of people who registered were signed up for Spring Into Motion, which had unlimited capacity.

Out of 1,848 people eligible to participate, 1,059 people signed up for a wellness activity, and 740 people successfully completed them. People who completed an activity received either $25 or $75, paid by direct deposit via University payroll, depending on which treatment group they had been assigned to.

[3] We sent a separate invitation on October 3 to the small number of participants who completed their online health risk assessment after September 27.

D.1.7 2017 online follow-up survey (July 10 - August 9)

We mailed a postcard (see Appendix Figure D.24) on July 5, 2017 to 4,824 participants in our study.[4] We included the UIUC-affiliated members of the research team in this mailing and confirmed that the postcards were delivered by July 8, 2017.

We sent an email invitation (see Appendix Figure D.25) containing the link to the online follow-up survey to each of the 4,824 study participants on the morning of July 10. Reminder emails were sent on July 18, July 26, August 2, and August 7 to participants who had not yet completed the survey. The survey closed at 10:20 am on August 9, at which point 3,561 study participants (73.7 percent) had successfully completed it.[5] Participants who completed the survey immediately received a confirmation email. They also received an electronic $20 Amazon.com gift card about one week after completing the survey. The confirmation email and gift card were formatted similarly to the ones employed for the initial baseline survey (see Appendix Figures D.7 and D.8).

The August 2 reminder informed participants that ten people who completed the follow-up survey would be chosen at random to receive a $100 Amazon.com gift card (see Appendix Figure D.26). This new potential reward was in addition to the guaranteed $20 Amazon.com gift card. Participants who had already completed the survey prior to August 2 were included in this drawing.

D.1.8 2017 follow-up health screening (August 21 – September 22)

All study participants, whether in the control or treatment groups, were eligible to complete the one-year follow-up health screening in 2017. We randomly assigned these individuals to one of two groups, which differed only in the size of incentives ($0 or $125) offered for completing the follow-up screening.

Our method of randomization for the follow-up screening incentive combined explicit stratification plus re-randomization. Our follow-up strata were constructed by splitting the original strata by study arm. Because there were 69 original strata (see Section D.1.2) and 7 study arms (6 treatment groups plus a

[4] A total of 4,834 participants completed the 2016 baseline survey, but 10 had subsequently withdrawn from the study at the time of this invitation.

[5] The survey was accidentally reopened later that month for several weeks. Although all participants had been told that the survey would close on August 9, seven participants nevertheless completed the survey after the August 9 deadline, bringing the final number of completions up to 3,568.

control group), this resulted in $483 = 69 \times 7$ follow-up strata, with the sample size per follow-up stratum ranging from 2 to 80.

To implement the stratified re-randomization, we generated multiple potential follow-up treatment assignments T_j as follows:

1. Draw a random integer s_j and set the random-number seed to equal s_j.

2. Randomly sort all 4,834 original study participants first by follow-up strata, then within each follow-up strata. Drop the individuals ($N = 15$) who had withdrawn from the study at the time of randomization (August 4, 2017), leaving a sample of $N = 4,819$ employees to be randomized.

3. Assign alternating observations to the \$0 and \$125 follow-up screening incentive group, and let T_j denote the resulting vector of treatment assignments for each employee.

4. Test for balance between the \$0 and \$125 groups for 60 variables (pre-determined at the time of follow-up randomization) grouped into the following 8 families:

   (a) Baseline strata (6 variables).

   (b) Baseline survey (21 variables).

   (c) Salary and age (3 variables).

   (d) Employment (7 variables).

   (e) Health behavior (6 variables).

   (f) Medical spending and coverage (8 variables).

   (g) Sick days taken (2 variables).

   (h) Registration for or completion of 2016 biometric screening, HRA, or Fall 2016 or Spring 2017 wellness activities (7 variables).

   We performed joint tests for balance by family of outcomes (8 balance tests), plus individual tests for balance for each of the medical spending outcomes, with and without coverage weights for average

spending outcomes (10 balance tests). In total, we performed 18 tests for balance, and we denote by p_j^{min} the minimum p-value across these tests.

After performing these steps for $j = 1$ to 10,000, we selected the treatment assignment that maximized the p-value p_j^{min} from the balance tests. Specifically, the selected treatment assignment was chosen to be T_{j^*}, where $j^* = \arg\max_j p_j^{min}$.

In total, 2,409 employees were assigned to the \$0 follow-up screening incentive, while 2,410 employees were assigned to the \$125 follow-up screening incentive. We sent email invitations on August 14, 2017 to these employees ($N = 4,819$) informing them of their monetary reward for completing the 2017 health screening, and explained how to sign up for it (see Appendix Figure D.27). We sent reminder emails on August 23, September 5, September 13, September 19, and September 21 to participants who had not yet signed up for a health screening.[6] The final reminder encouraged participants to walk in for a health screening even if they did not have an appointment (see Appendix Figure D.28).

The iThrive website was updated on August 14, 2017 so that treatment group participants could obtain information about the 2017 follow-up health screening and their potential rewards. For the first time, control group members were also given login access to the iThrive website. Everyone was encouraged to visit the website in the August 14 screening invitation email (Appendix Figure D.27). For control group members, the website only displayed information about the health screenings (see Appendix Figure D.29). For treatment group members, the website displayed information about the subsequent health risk assessment and wellness activities once the treatment group member completed a screening (see Appendix Figure D.30).

Health screenings were held in the same locations as in 2016, with the exception of the Physical Plant Services Building, which was unavailable for reservation. Unlike in 2016, people were allowed to make appointments all the way until 3:50 PM. The full schedule of appointment times and locations is reported in Appendix Table D.4.

The health screening procedure was nearly identical to the procedure employed in 2016 (see Section D.1.3 for a full description). There were only two substantive differences. First, participants were not

[6] Study participants who signed up for a screening, but later failed to show up for their appointment, were included in these reminder emails.

handed a postcard at the end of the screening reminding them to check their email for an invitation to take the online health risk assessment. This step was omitted in 2017 because follow-up screening participants in that year included employees from the control group, who were not eligible to take the 2017 online health risk assessment. Second, health screening confirmation emails were sent only to participants who had been assigned a $125 reward (see Appendix Figure D.31). Screening participants in both the control and treatment groups who were assigned a $0 reward did not receive a screening confirmation email. However, all participants could confirm their completion status by visiting the iThrive website.

D.1.9 2017 online health risk assessment (August 21 – October 6)

Treatment group members who completed the 2017 follow-up health screening were invited to complete an online health risk assessment (Appendix Figure D.32). The format of the 2017 online health risk assessment survey was the same as the 2016 survey. Reminder emails were sent on September 11, September 18, September 28, October 3, and October 6 to participants who had received the invitation but had not yet completed the assessment as of the reminder date. Unlike in 2016, participants did not have to complete the health risk assessment in order to earn their reward for the health screening they had just completed. But, as before, participants had to complete the health risk assessment in order to be eligible to sign up for wellness activities in the fall or spring.

D.1.10 2017 fall wellness activities (October 16 – December 15)

We sent email invitations (Appendix Figure D.33) for the Fall 2017 wellness activities on October 2 to participants who had successfully completed their 2017 online health risk assessment. Participants were able to sign up for activities immediately, but no activities began before October 16. Signups were done via the Thrive website. Appendix Table D.5 lists the different activities that were available. Over 70 percent of people who registered were signed up for Walktober.

Out of 1,272 people eligible to participate, 771 people signed up for a wellness activity, and 439 people successfully completed one. Twenty people who completed an activity were randomly selected to receive $50 Amazon.com gift cards.

D.1.11 2018 spring wellness activities (February 5 – April 26)

We sent email invitations (Appendix Figure D.34) for the Spring 2018 wellness activities on January 22 to participants who had successfully completed their 2018 online health risk assessment. Participants were able to sign up for activities immediately, but no activities began before February 5. Signups were done via the Thrive website. Appendix Table D.6 lists the different activities that were available. Over 60 percent of people who registered were signed up for Keep America Active.

Out of 1,272 people eligible to participate, 607 people signed up for a wellness activity, and 342 people successfully completed one. Twenty people who completed an activity were randomly selected to receive $50 Amazon.com gift cards.

D.1.12 2018 online follow-up survey (July 9 - August 7)

We mailed a postcard (similar to the one shown in Appendix Figure D.24) on July 5, 2018 to 4,800 participants in our study.[7] We included the UIUC-affiliated members of the research team in this mailing and confirmed that the postcards were delivered by July 11, 2018.[8]

We sent an email invitation (see Appendix Figure D.35) containing the link to the online follow-up survey to each of the 4,800 study participants on the morning of July 9. Reminder emails were sent on July 18, July 25, and August 6 to participants who had not yet completed the survey. The survey closed at 11:59 pm on August 7. A total of 3,020 study participants (62.5 percent) successfully completed the survey.[9] Participants who completed the survey immediately received a confirmation email. They also received an electronic $20 Amazon.com gift card about one week after completing the survey. The confirmation email and gift card were formatted similarly to the ones employed for the initial baseline survey (see Appendix Figures D.7 and D.8). Unlike in 2017, participants were not also entered into a gift card drawing in return for completing the 2018 survey.

[7] 4,834 participants completed the 2016 baseline survey, but 34 had subsequently withdrawn from the study at the time of this invitation.

[8] Some members of the research team received their postcards on July 9, but one person did not receive it until July 10 and another person did not receive it until July 11.

[9] Although we told participants that the survey closed on August 7, the survey links were left active until August 24. Fifteen participants completed the survey between August 8 and 24.

D.1.13 2018 follow-up health screening (August 20 – September 21)

All study participants, whether in the control or treatment groups, were eligible to complete the two-year follow-up health screening in 2018. We randomly assigned these individuals to one of two groups, which differed only in the size of incentives ($0 or $75) offered for completing the follow-up screening. We employed the same method of randomization as in 2017 (see Section D.1.8).

In total, 2,399 employees were assigned to the $0 incentive group, and 2,400 employees were assigned to the $75 incentive group. We sent email invitations on Monday, August 13 to these employees ($N = 4,799$) to inform them of their monetary reward for completing the 2018 health screening and to explain how to sign up for it (see Appendix Figure D.36). We sent reminder emails on August 22, September 6, September 12, September 18, and September 20 to participants who had not yet signed up for a screening. The full schedule of appointment times and locations is reported in Appendix Table D.7.

The health screening procedure was nearly identical to the procedure employed in 2017 (see Section D.1.8). One difference is that the formatting of the health screening form (Appendix Figure D.37) changed slightly from the previous version of the form (Appendix Figure D.18). In particular, the "clinician's comment" text box at the bottom of the 2016/2017 forms was removed from the 2018 form. Thus, these text data are not available in 2018.

D.2 Datasets

D.2.1 University administrative data

The University of Illinois provided us with an initial list of 12,459 employees who met the following criteria as of June 10, 2016: (1) located at the Urbana-Champaign campus; and (2) eligible for part-time or full-time employee benefits from the Illinois Department of Central Management Services. The university administrative datasets described below are available for all 12,459 of these employees.

Demographics

This dataset includes first and last names, mailing address, email address, exact date of birth, sex, annual salary, job title, race (white, black, or other), employee class (faculty, academic staff, or civil service), home

college (49 colleges), home organization (323 organizations), and exact hire date.

Employment history

This dataset includes employment history information up through August 15, 2017. It includes the exact hire date for all employees. Out of the initial sample of 12,459 employees, 1,537 of these employees were no longer actively employed by the university as of August 15, 2017. For these former employees, the dataset includes the exact date of employment termination and the associated reason (resigned, retired, deceased, terminated, contract ended, or other). For active employees, the dataset lists their annual salary and job title as of August 15, 2017.[10] Some employees lack a job title while others sometimes have multiple job titles. In cases with more than one title, this dataset assigns each title a fraction of the employee's salary.

Sick leave

This dataset includes the number of sick days taken by a Civil Service employee at the monthly level, for the time period January 2015 through May 2017. For non-Civil Service employees (i.e., Academic Staff and Faculty), the dataset includes the total number of sick days taken during the two time periods August 16, 2015 through August 15, 2016, and August 16, 2016 through May 15, 2017. Sick leave for faculty (25 percent of our sample) is self-reported and exhibits little variation: more than 75 percent of the faculty in our sample reported 0 days of sick leave during the August 16, 2015 through August 15, 2016 academic year.

The vast majority of employee sick leave is noncompensable, i.e., it cannot be "cashed out" when the employee terminates employment.[11] Civil Service employees accrue sick leave at the rate of 0.0462 hours for each hour worked, which corresponds to approximately 12 days per year for a full-time employee, and this sick leave is cumulative (i.e., rolls over from one year to the next). Full-time Academic Staff and Faculty earn 12 cumulative and 13 non-cumulative sick leave days per year, and their total sick leave is recorded in the data only twice a year: on May 16 and on August 16.

[10] Civil Service, Academic Staff, and Faculty received a mid-year salary increase in the second half of February, 2017. The salary increase was explicitly merit-based, and the total salary pool was capped at 2 percent of aggregate base salaries.

[11] Prior to 1999, employees could accrue compensable sick leave. A few older employees still have positive compensable sick leave balances, but this is very rare.

Gym attendance

This dataset includes a list of the exact dates that each employee visited one of the university's campus recreational facilities during the time period January 1, 2015 through July 31, 2017. There are three recreational facilities located on the university campus: the Activities and Recreation Center (ARC), the Campus Recreation Center East (CRCE), and the Ice Arena. Membership costs $40 per month for university employees and retirees. Entering these facilities requires swiping a university identification card through a machine, which is the basis for the observations in this dataset.

D.2.2 Illinois Marathon data

The Illinois Marathon is a running event held annually in Champaign, Illinois. The races offered include a marathon, a half marathon, a 5K, and a 10K. When registering for a race, a participant must provide her name, age, sex, and hometown. That information, along with the results of the race, are published online after the races have concluded.[12]

We downloaded Illinois Marathon data for the 2014-2018 races and matched it to individuals in our study data using full name, age, sex, and hometown. An individual in our study data was counted as participating in a running event in a given year if either (a) University and Illinois Marathon records matched on full name, age (+/- 1 year), and sex; or (b) University and Illinois Marathon records matched on the first two letters of last name, age (+/- 1 year), sex, and hometown. Among University employees that match to Illinois Marathon records using *either* match measure, *both* measures generate a match in 73.7, 74.6, 84.4, and 79.6 percent of cases for the years 2014, 2015, 2016, and 2017, respectively.

D.2.3 Health insurance claims data

We obtained health insurance claims data for 8,461 university employees (anonymized for non-study participants) who were listed in our university administrative dataset and who were members of Health Alliance at any point during the period January 1, 2015 through January 31, 2019. (Note: 8,096 employees were members during the pre-period July 1, 2015 through July 31, 2016.) The dataset includes all inpatient,

[12] See http://illinoismarathon.com/resultscertificatesphotos/#results.

outpatient, and prescription drug claims with a date of service between January 1, 2015 through June 30, 2017. Each claim lists a date of service, a physician specialty code, a place of service code, and the total allowed amount, which is the sum of payments to the provider from both the insurer and the beneficiary. Health Alliance also provided an enrollment file listing start and end dates for each member.

Health Alliance, the university's most popular insurer, operates an HMO plan with a $0 medical deductible and a $100 annual pharmacy deductible. Physician visits require a $20 copay, and the plan's out-of-pocket maximum is $3,000 for the individual and $6,000 for the family.

The university offers seven different health insurance plans. One of these, Quality Care Health Plan, is a traditional indemnity insurance plan.[13] The rest are managed care plans, including four Health Maintenance Organizations (BlueAdvantage HMO, Coventry HMO, Health Alliance HMO, and HMO Illinois) and two Open Access Plans (Coventry OAP and HealthLink OAP). Beginning July 1, 2017, Coventry HMO and Coventry OAP were renamed Aetna HMO and Aetna OAP.

Employee contributions are the same for all HMO plans, and depend on income. For the 2016-2017 plan year, an employee's monthly contribution for an HMO plan ranged from $68 per month (annual salary $30,200 and below) up to $186 per month (annual salary $100,001 and above). Contributions for an employee enrolled in Quality Care Health Plan ranged from $93 per month (annual salary $30,200 and below) up to $211 per month (annual salary $100,001 and above). The seven health plans charge different contributions for dependents, with dependent contributions ranging from $96 per month (BlueAdvantage HMO) to $249 per month (Quality Care Health Plan).

Vision insurance is automatically provided for free to enrollees in one of the university's health insurance plans. EyeMed Vision Care is the administrator for the vision coverage. University employees enrolled in these health plans are also eligible to enroll into the university's (separate) dental plan. As of July 1, 2017, dental premiums were $11 per month for an employee, $17 per month for an employee and one dependent, and $19.50 per month for an employee and two dependents. Delta Dental of Illinois is the administrator for the dental plan.

[13] This plan was administered by Cigna up through June 30, 2017. Aetna has administered it since July 1, 2017.

D.2.4 Online survey data

2016 baseline survey

The baseline survey was administered online using survey software provided by SurveyGizmo. An email invitation containing the link to the online baseline survey was sent to 12,459 university employees. Each link was unique and pointed to a survey that could only be completed once. Survey participants navigated the survey by clicking on buttons labeled "Next" and "Back". They were allowed to skip questions and to change their answers on previous pages if so desired. In order to receive their $30 Amazon.com gift card, participants had to navigate to the end of the survey and click the "Submit" button. The software did not allow them to change their answers once the survey was submitted. Participants who exited the survey prior to completion could continue from where they left off by clicking on their invitation link again.

The software recorded that 7,468 employees clicked on the link to the survey, 4,918 employees began the survey, and 4,834 employees successfully completed the survey. Among those who completed the survey within an hour of clicking on the survey link for the first time, the average completion time was 15 minutes.

In order to assess the reliability of the survey, we compared participants' self-reported ages from the survey with the ages available in the university's administrative data. Of the 4,830 participants who reported an age, only 24 ($<0.5\%$) reported a value that differed from the university's data by more than one year.

2017 follow-up survey

The 2017 follow-up survey was administered online using survey software provided by SurveyGizmo. An email invitation containing the link to the follow-up survey was sent to 4,824 study participants.[14] The format of the invitation email and the survey were similar to the 2016 baseline survey. In order to receive their $20 Amazon.com gift card, participants had to navigate to the end of the survey and click the "Submit" button.

The software recorded that 3,642 employees clicked on the link to the survey, 3,611 employees began

[14] A total of 4,834 participants completed the 2016 baseline survey, but 10 had subsequently withdrawn from the study at the time of the 2017 survey invitation. Another 5 participants withdrew over the course of the 2017 survey period, so the total number of subjects in our second-year sample is equal to 4,819.

the survey, and 3,567 employees successfully completed the survey. Among those who completed the survey within an hour of clicking on the survey link for the first time, the average completion time was 13.3 minutes. The completion rates for the control and treatment groups were 75.4 and 73.1 percent, respectively. The difference in completion rates is marginally significant ($p = 0.079$).

In order to assess the reliability of the survey, we compared participants' self-reported ages from the survey with the ages available in the university's administrative data. Of the 3,561 participants who reported an age, only 20 ($< 0.6\%$) reported a value that differed from the university's data by more than one year.

2018 follow-up survey

The 2018 follow-up survey was administered online using survey software provided by SurveyGizmo. An email invitation containing the link to the follow-up survey was sent to 4,800 study participants.[15] The format of the invitation email and the survey were similar to the 2016 baseline survey. In order to receive their $20 Amazon.com gift card, participants had to navigate to the end of the survey and click the "Submit" button.

The software recorded that 3,120 employees clicked on the link to the survey. In total, 3,020 employees successfully completed the survey. Among those who completed the survey within an hour of clicking on the survey link for the first time, the average completion time was 16.9 minutes. The completion rates for the control and treatment groups were 64.6 and 61.5 percent, respectively. This difference in completion rates is statistically significant ($p = 0.036$).

In order to assess the reliability of the survey, we compared participants' self-reported ages from the survey with the ages available in the university's administrative data. Of the 3,009 participants who reported an age, only 16 ($< 0.6\%$) reported a value that differed from the university's data by more than one year.

[15] A total of 4,834 participants completed the 2016 baseline survey, but 34 had subsequently withdrawn from the study at the time of this invitation.

D.2.5 Health screening data

Fall 2016 health screening

2,047 participants signed up for a health screening, and 1,900 were successfully screened. The top of each participant's screening form (see Appendix Figure D.18) contains the participant's answers to the following questions:

1. "Do you use tobacco of any form?"
2. "In the average week, how many times do you engage in physical activity?"
3. "If you engage in physical activity, for how long?"
4. "How often do you feel tense, anxious, or depressed?"
5. "Do you have a primary physician?"
6. "Did you fast today?"

The following biometric data were recorded on every form: height; weight; waist circumference; body mass index; systolic blood pressure; diastolic blood pressure; total cholesterol; total cholesterol ratio; HDL; LDL; triglycerides; and glucose. Finally, the form also records which (if any) of the following actions were taken by the health coach (see also Appendix Figure D.19) as a result of the patient's biometric readings:

1. Referred patient to a primary care physician
2. Advised patient to make minor lifestyle changes
3. Communicated to patient that one or more results were out of the normal range
4. Communicated to patient that the results require a medical referral
5. Communicated to patient that the results require immediate medical attention

In order to ensure accuracy, all of the data on every form was read and entered into a database twice, by two different research assistants. Any disagreements between the two entries were resolved by reexamining the original form.

Fall 2017 health screening

The control and treatment groups were both invited to the fall 2017 health screening. A total of 2,004 people from both groups were successfully screened. The data were digitized using the procedure outlined in the description of the fall 2016 health screening data.

Fall 2018 health screening

The control and treatment groups were both invited to the fall 2018 health screening. A total of 1,761 people from both groups were successfully screened. The data were digitized using the procedure outlined in the description of the fall 2016 health screening data.

The screening form was redesigned in 2018 (see Appendix Figure D.37). Because the 2018 screening form omitted the box for "waist circumference," the clinicians recorded waist circumference measures using other available space on the form. (The screening form also omitted the box for A1C, but A1C was never measured in any of the 2016-2018 screenings.) In addition, the section for clinician comments at the bottom of the form was removed in 2018, and the formatting of the checkboxes for "Fasting" and "Non-Fasting" changed in 2018. These changes may have affected the recording of some of the waist circumference measures and the checkbox "Fasting" measures on the first day of the 2018 health screenings.

D.2.6 Health questionnaire data

Fall 2016 health questionnaire

Participants were required to fill out a health questionnaire on site just prior to receiving their health screening, so every participant who was screened (1,900 in total) is also represented in this dataset. A copy of the questionnaire is displayed in Appendix Figure D.17. As with the health screening data, these data were digitized twice in order to ensure accuracy.

Fall 2017 health questionnaire

Every participant who was screened in 2017 (2,004 in total) is also represented in this dataset. The data were digitized using the procedure outlined in the description of the fall 2016 health questionnaire data.

Fall 2018 health questionnaire

Every participant who was screened in 2018 (1,761 in total) is also represented in this dataset. The data were digitized using the procedure outlined in the description of the fall 2016 health questionnaire data.

D.2.7 Online health risk assessment and wellness activities data

Fall 2016/ Spring 2017 online health risk assessment and wellness activities

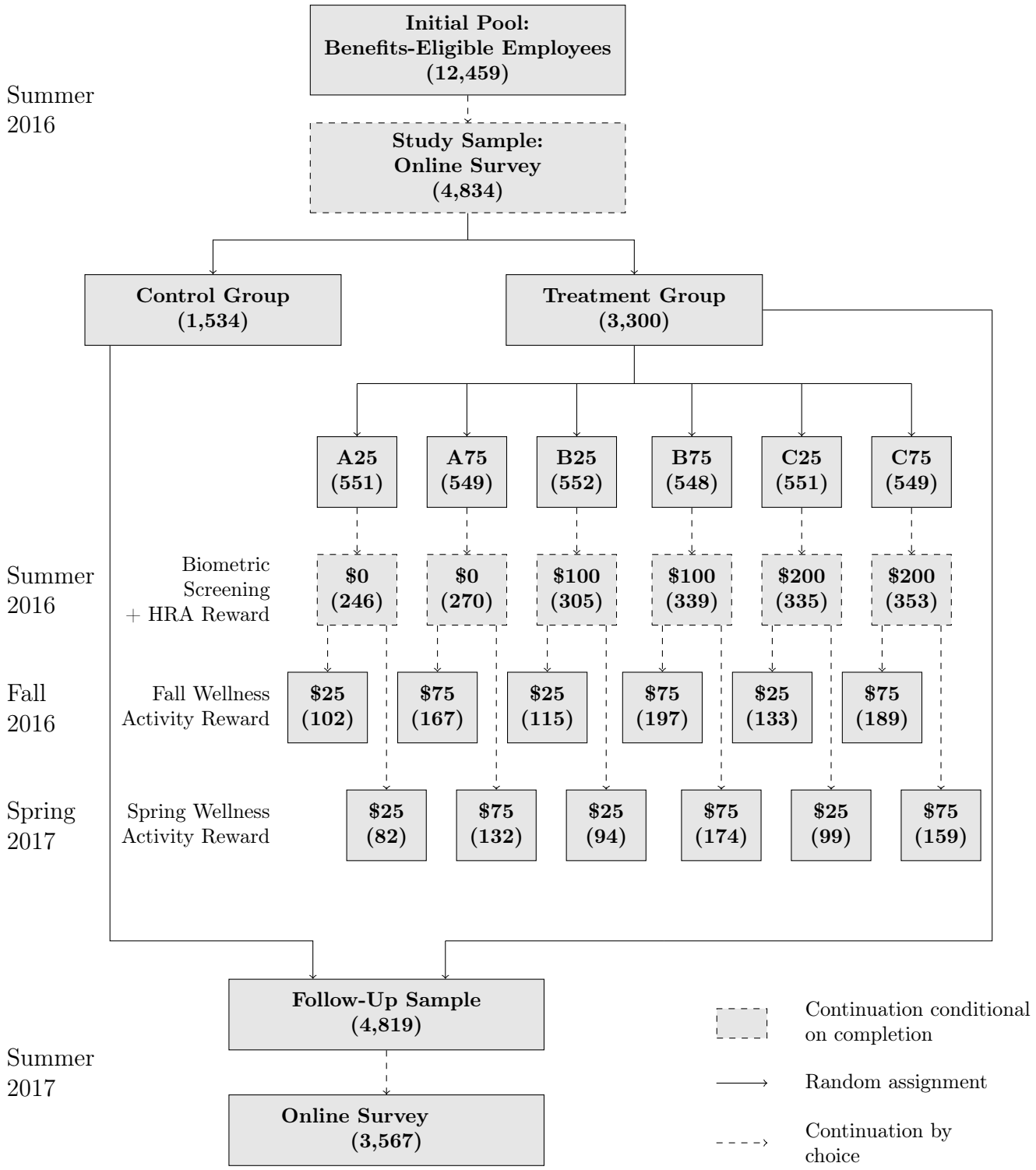
Out of the 1,900 participants who completed a health screening, 1,848 completed an online health risk assessment. These 1,848 participants constitute the set of study participants who were eligible to sign up for wellness activities in the fall and in the spring. Participants were not required to sign up for a fall activity in order to sign up for a spring activity. Out of the 1,848 people eligible to participate, 1,304 people signed up for a fall wellness activity (903 completed it) and 1,059 people signed up for a spring wellness activity (740 completed it).

The online health risk assessment (HRA) data contain the exact start dates and times that participants began their HRA, and the exact end dates and times they completed it. The wellness activity data include indicator variables for whether the participant signed up for a wellness activity, and for whether the participant completed that activity. If the participant signed up for an activity, the name of the activity was also recorded. (See Appendix Tables D.2 and D.3 for names and descriptions of the activities that were offered.) The wellness activities data also include information on how much of the activity was completed by the participant, along with the minimum threshold required to qualify for the wellness activity reward.[16]

[16]For example, the Spring 2017 "Lunchtime Walk" activity met on 8 separate occasions, and participants were required to participate in at least 6 of the walks in order to qualify for their reward. The wellness activities data contains a variable specifying how many walks each participant attended.

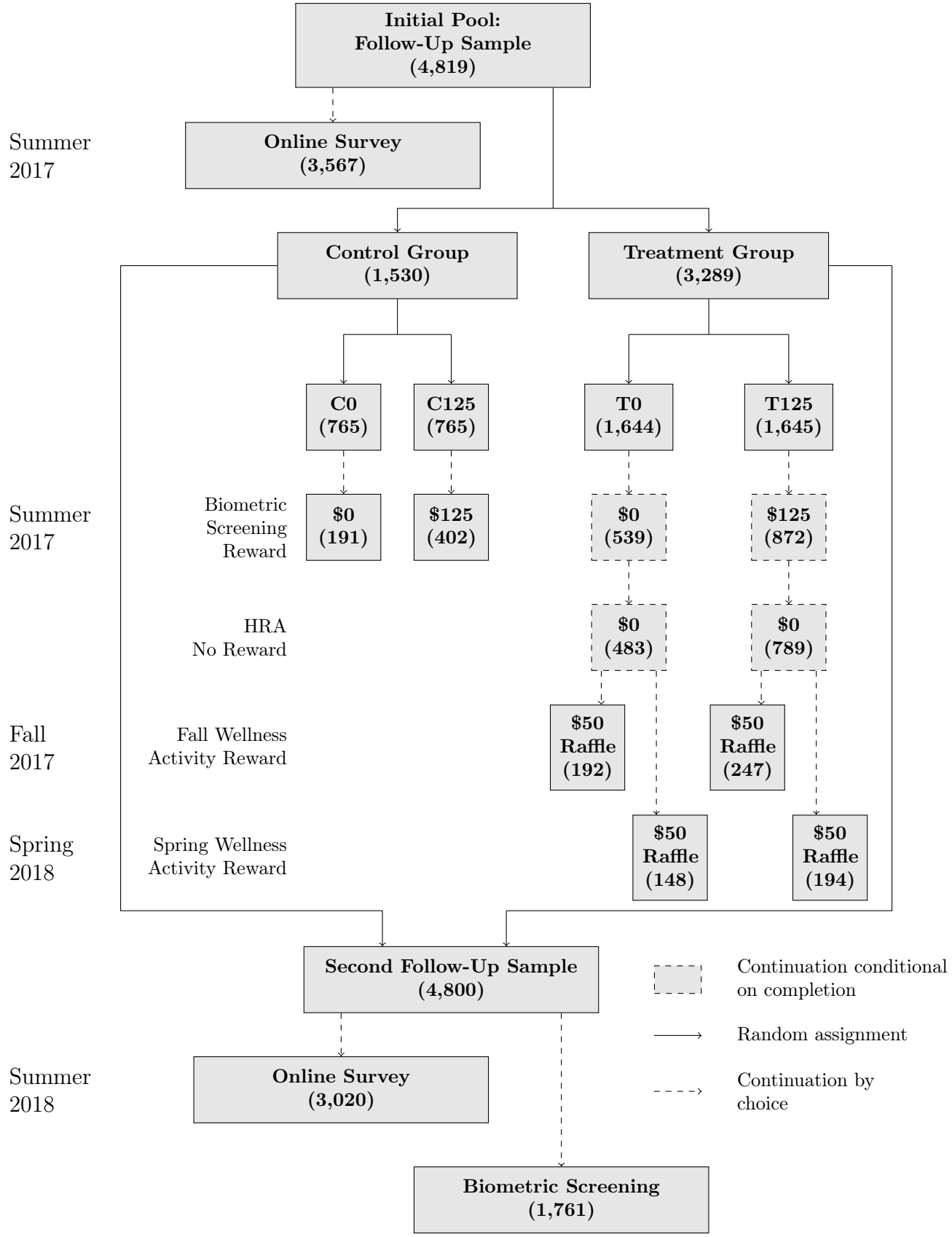
D.3 Online Appendix Figures

Figure D.1: Experimental Design of the Illinois Workplace Wellness Study in Year 1



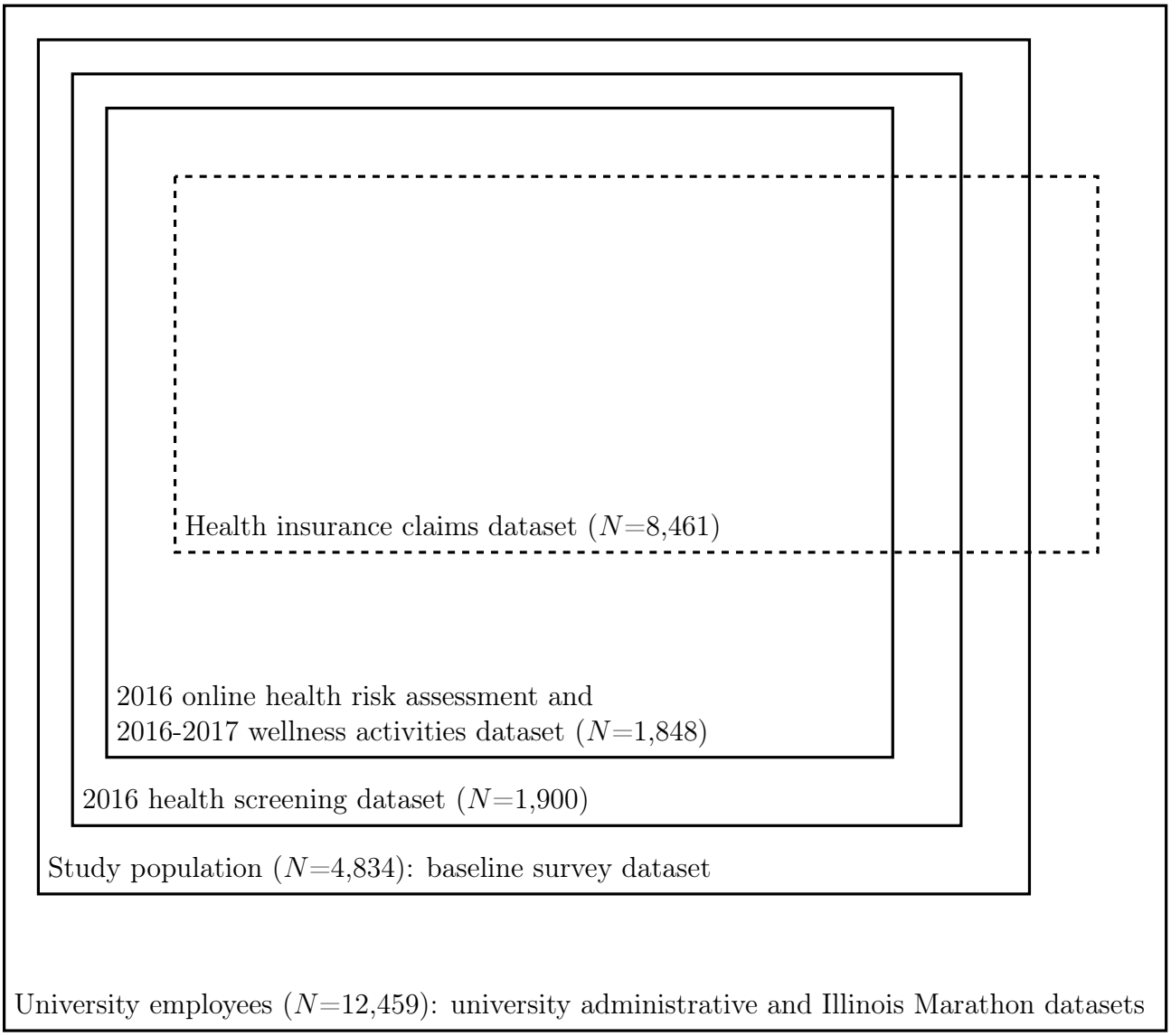
Notes: Sample sizes are given in parentheses.

Figure D.2: Experimental Design of the Illinois Workplace Wellness Study in Year 2



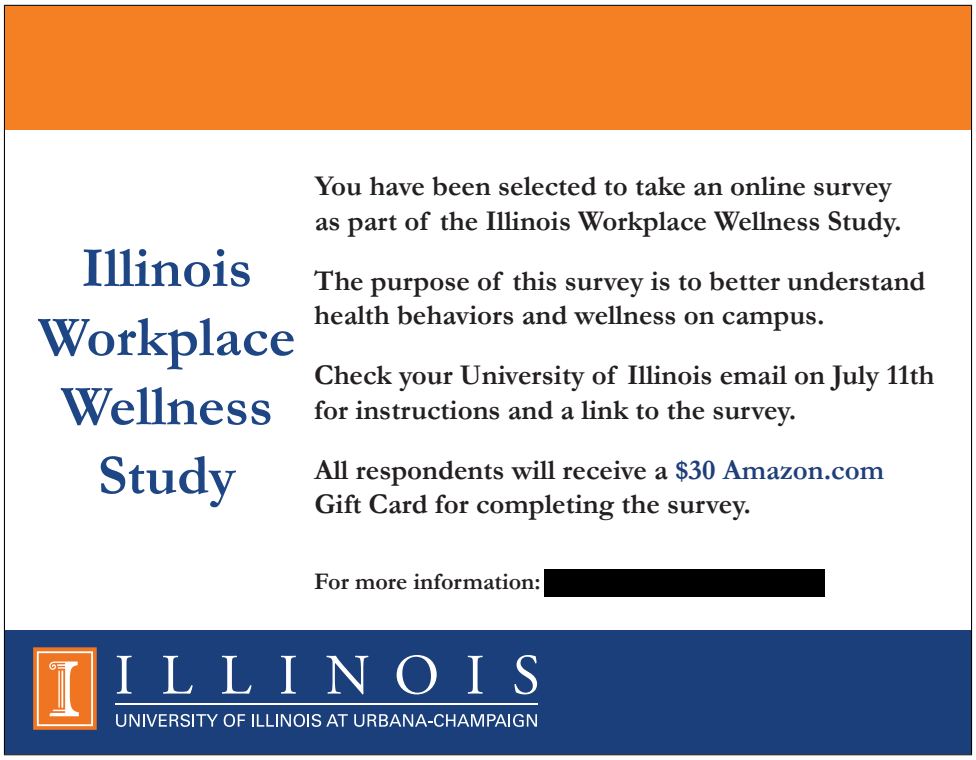
Notes: Sample sizes are given in parentheses.

Figure D.3: Overlap among datasets



Notes: Number of observations is given in parentheses. Number of observations for the health insurance claims dataset corresponds to the number of employees who were members of Health Alliance at any point during the period January 1, 2015 through January 31, 2019. This figure does not depict all datasets collected as part of the study.

Figure D.4: Front and back sides of invitation postcard sent on July 6, 2016



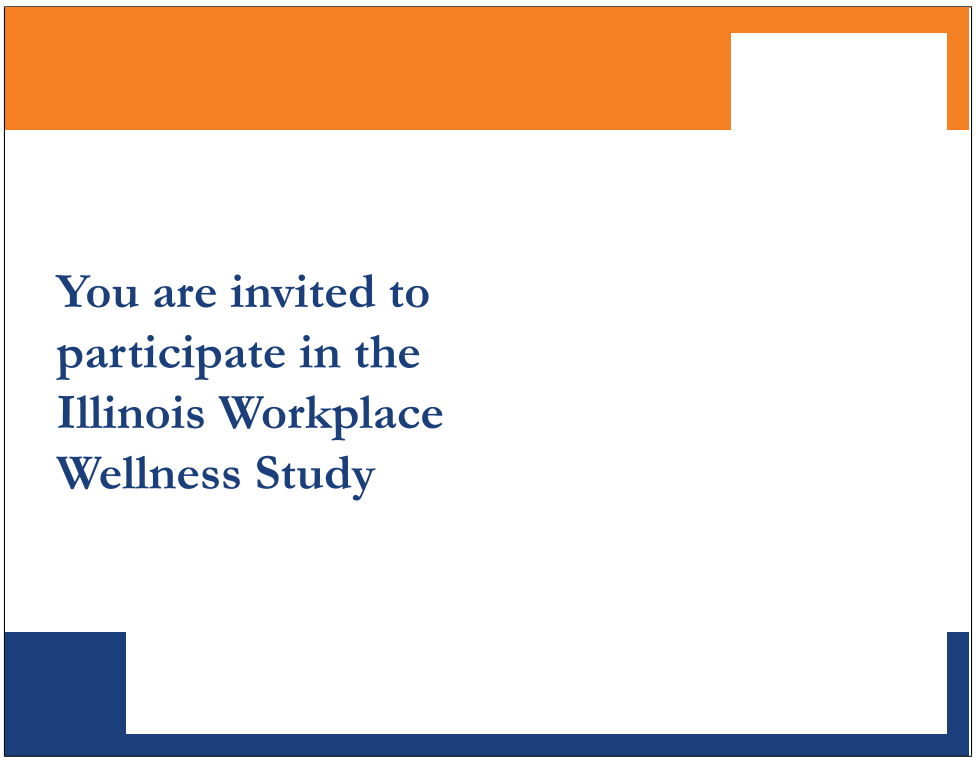
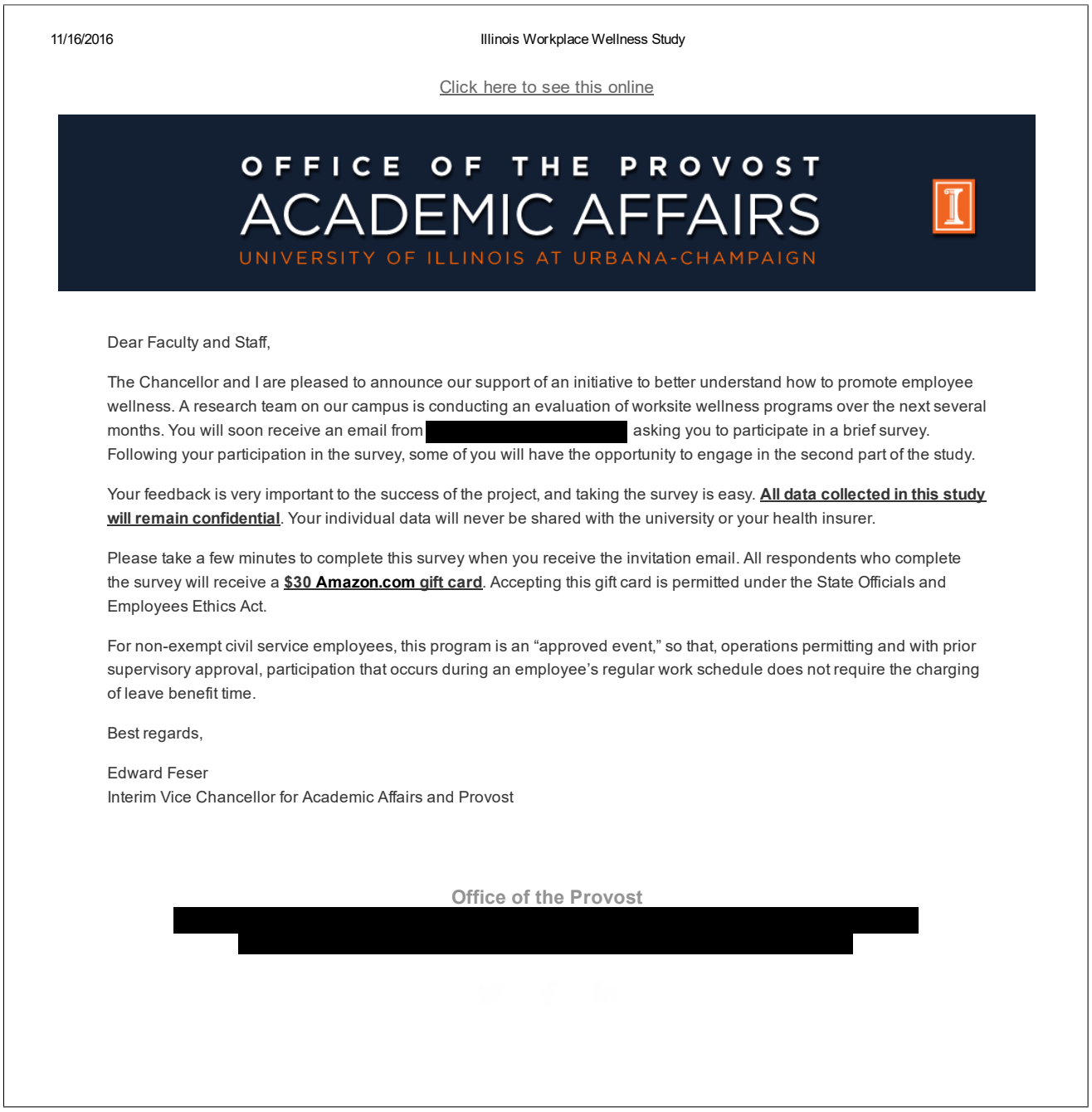


Figure D.5: Email sent from the UIUC Provost to university employees on July 11, 2016



11/16/2016 Illinois Workplace Wellness Study

Click here to see this online

OFFICE OF THE PROVOST
ACADEMIC AFFAIRS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Dear Faculty and Staff,

The Chancellor and I are pleased to announce our support of an initiative to better understand how to promote employee wellness. A research team on our campus is conducting an evaluation of worksite wellness programs over the next several months. You will soon receive an email from [redacted] asking you to participate in a brief survey. Following your participation in the survey, some of you will have the opportunity to engage in the second part of the study.

Your feedback is very important to the success of the project, and taking the survey is easy. **All data collected in this study will remain confidential**. Your individual data will never be shared with the university or your health insurer.

Please take a few minutes to complete this survey when you receive the invitation email. All respondents who complete the survey will receive a **$30 Amazon.com gift card**. Accepting this gift card is permitted under the State Officials and Employees Ethics Act.

For non-exempt civil service employees, this program is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

Best regards,

Edward Feser
Interim Vice Chancellor for Academic Affairs and Provost

Office of the Provost
[redacted]

Notes: Email also available at http://illinois.edu/emailer/newsletter/100150.html.

Figure D.6: Invitation email sent to university employees on July 11, 2016

Illinois Workplace Wellness Study Invitation

From: **Illinois Workplace Wellness Study** [redacted]
Date: Monday, July 11, 2016 10:34 AM
Subject: Illinois Workplace Wellness Study Invitation
To:

Dear Colleagues,

We invite you to take part in a research study of workplace wellness programs. This study is funded by the National Institutes of Health and will help inform national health policy regarding the costs and benefits of wellness programs.

The first part of the study consists of an online survey about health behaviors and wellness on campus. The survey will take approximately 15 minutes to complete. We know that your time is valuable, so we are offering a **$30 Amazon.com gift card** to all respondents who complete the survey.

The survey is only available for a limited time, so please complete the survey promptly in order to receive your $30 gift card. To access the online survey, simply click the following URL or paste it in your browser:

http://surveys.citl.illinois.edu/go/Wellnessjx421

This survey is strictly confidential. **Your individual data will never be shared with the university or your health insurer.** Some of you who take the survey will be offered an opportunity to participate in a second part of the research study.

For non-exempt civil service employees, this program is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

Thank you for contributing to this important research project! If you have any questions or need assistance, please contact us at [redacted]

Best regards,

Illinois Workplace Wellness Study Team

David Molitor
Assistant Professor, Department of Finance

Laura Payne
Associate Professor, Department of Recreation, Sport and Tourism

Julian Reif
Assistant Professor, Department of Finance and IGPA

Figure D.7: Text of the confirmation email sent to study participants who successfully completed the online baseline survey

From: [redacted]
Subject: Survey Confirmation: Illinois Workplace Wellness Study

Dear **[First name]**,

Congratulations! This email is confirmation that you have completed the online survey for the Illinois Workplace Wellness Study. You will soon receive an email containing your $30 Amazon.com gift card. Please allow up to one week for the gift card to be processed.

You may be selected to participate in the second part of the study. If so, we will email you within the next month.

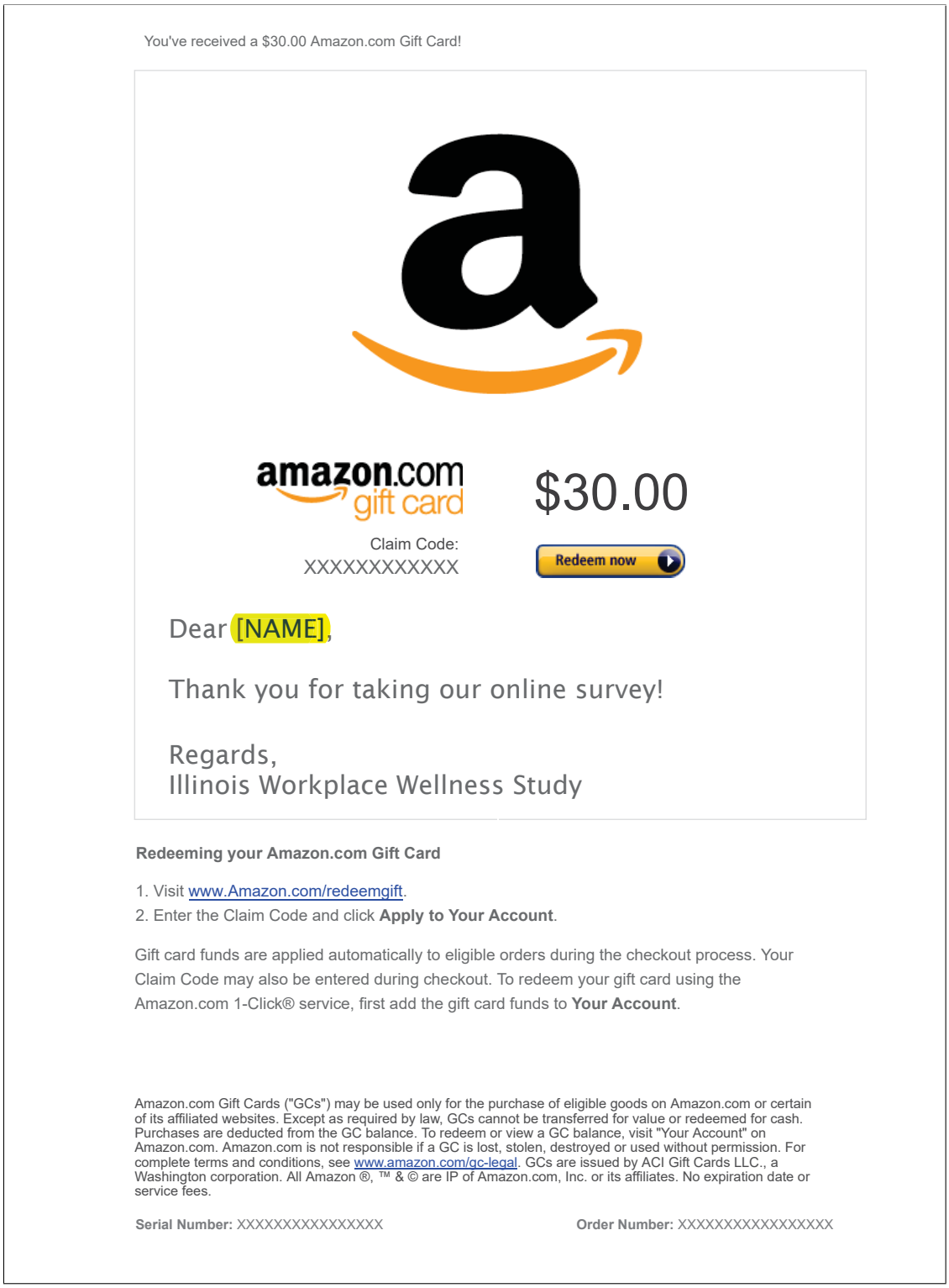
If you have any questions or need assistance, please contact us at [redacted]

Regards,

Illinois Workplace Wellness Study Team

Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.8: Electronic Amazon.com gift card sent to participants who completed the baseline survey



Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.9: Text of invitation email sent to participants in treatment group C75 ($350 incentive) on August 9, 2016

From: [redacted]
Subject: Illinois Workplace Wellness Study: iThrive Invitation

Dear **[First Name]**:

Last month, you completed a health survey as part of the Illinois Workplace Wellness Study. You have been selected to participate in the second part of this research study: iThrive, a program to promote health and wellness among campus faculty and staff.

iThrive offers you the opportunity to participate in valuable health screening and wellness activities at no cost to you. In addition, **you can earn up to $350 in financial rewards**, as described below.

The opportunity to participate in iThrive is only available for a limited time. To learn more about how to get started and earn rewards, visit the iThrive website:

iThrive.illinois.edu

The iThrive website provides personalized information on your progress, links for signing up for iThrive opportunities, answers to frequently asked questions (FAQs), and a summary of your rewards. To help you get started, you will receive an invitation later today from Presence Health, in order to schedule your health screening.

The iThrive program is summarized below.

How iThrive Works

iThrive begins with a health screening and health assessment survey. Once you complete the screening and health assessment, you are eligible to enroll in wellness activities in Fall 2016 and again in Spring 2017.

Step 1: Health Screening + Health Assessment Survey ($200 reward)

The health screening is your gateway to iThrive. The purpose of a health screening is to measure physical health characteristics (e.g., height, weight, blood pressure, cholesterol) and use the information as a benchmark for health promotion and management. For your convenience, Presence Health will offer these screenings at various dates and locations across campus.

After completing the health screening, you will receive an invitation to complete an online health assessment survey. The health assessment will provide you with a detailed health summary and evaluation of health risks. Upon completion of the health screening and health assessment survey, you will receive a reward of $200.

Step 2: Wellness Activities (up to $150 reward)

After completing your health screening and health assessment survey, you will have the opportunity to participate in a wellness activity that aligns with an area of your health that you would like to improve. These areas include physical activity, weight management, stress management, chronic disease self-management, and tobacco cessation. You will have the option to participate in programs that meet in person, or you may choose to participate in one of our online, self-paced programs.

These activities will be offered in Fall 2016 and again in Spring 2017. Completing your chosen wellness activity in Fall 2016 will entitle you to a $75 reward. Completing an activity in Spring 2017 will entitle you to another $75 reward, for a total possible reward of $150 for wellness activities. If you do not complete an activity in Fall 2016, you are still eligible to participate in Spring 2017 and receive a $75 reward.

Enrolling in iThrive

You enroll in iThrive by scheduling your health screening. When scheduling your health screening, please use the email address to which this email was sent (**netid@illinois.edu**). This email address will be referred to as your "iThrive contact email". You will receive an email from Presence Health today with a link to the online scheduler. You can also access the online scheduler now by copying and pasting the following URL into your browser:

ithrive.acuityscheduling.com

You may also visit the iThrive website at any time: iThrive.illinois.edu. This website will provide personalized information on your progress, links for signing up for iThrive opportunities, and a summary of your rewards.

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. You can read here about the purpose of our study as well as the steps we will take to keep your information confidential. If you have any questions or need assistance, please contact us at [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.10: Front and back sides of the postcard mailed to participants selected to participate in iThrive, week of September 8, 2016

Figure D.11: Login page for the iThrive website

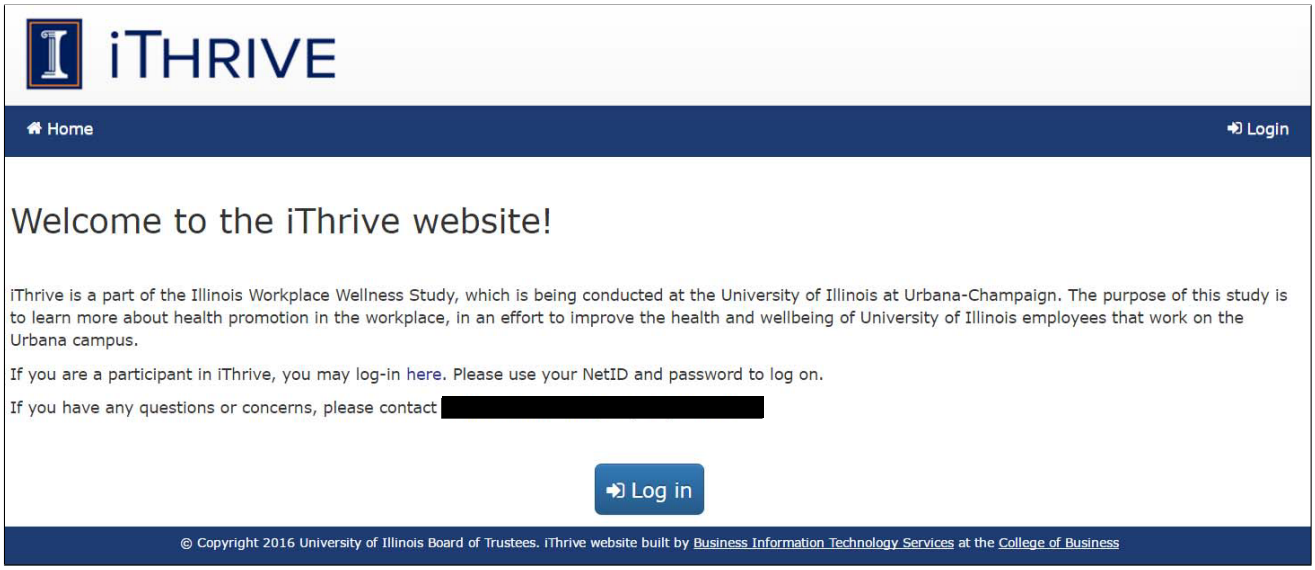
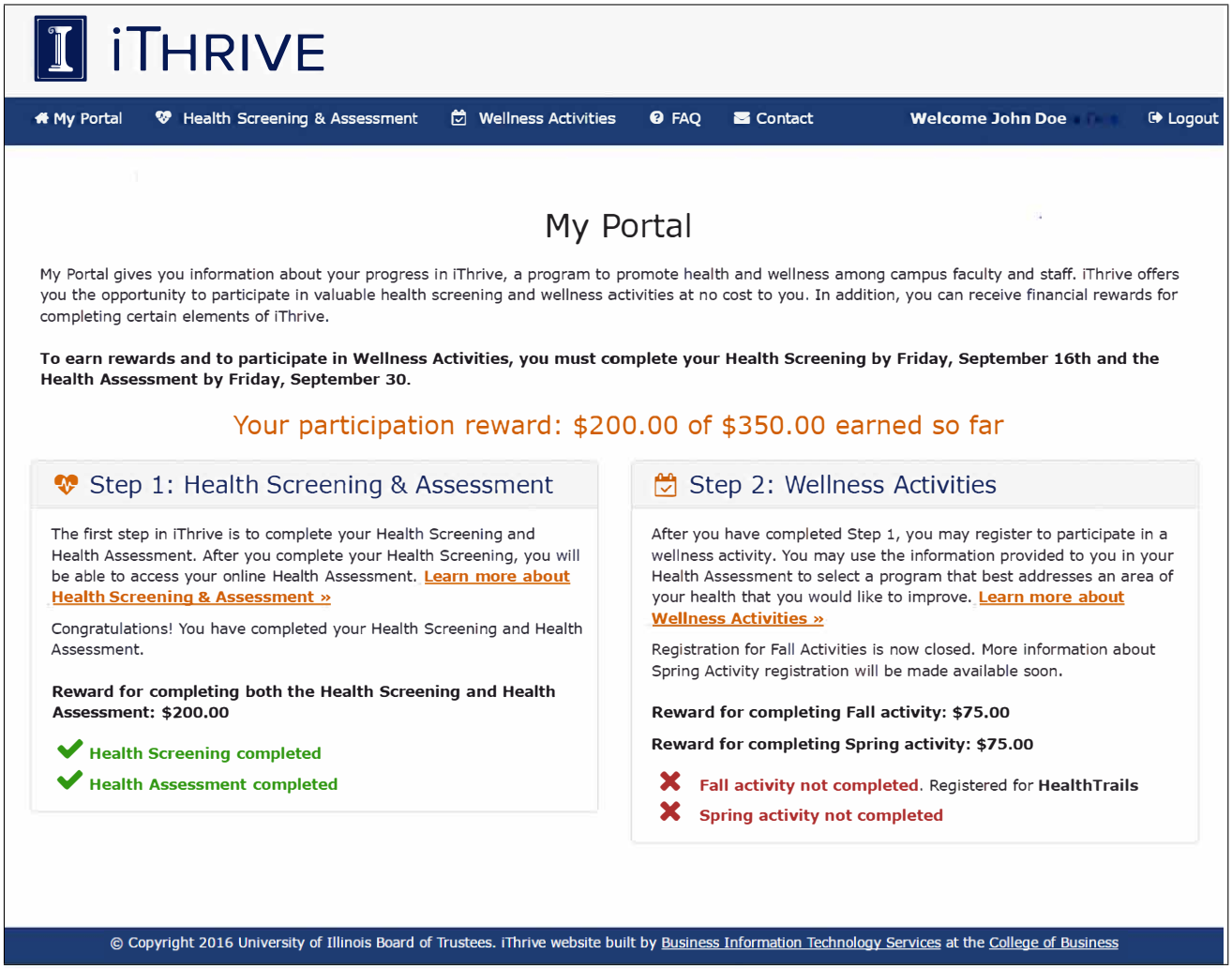
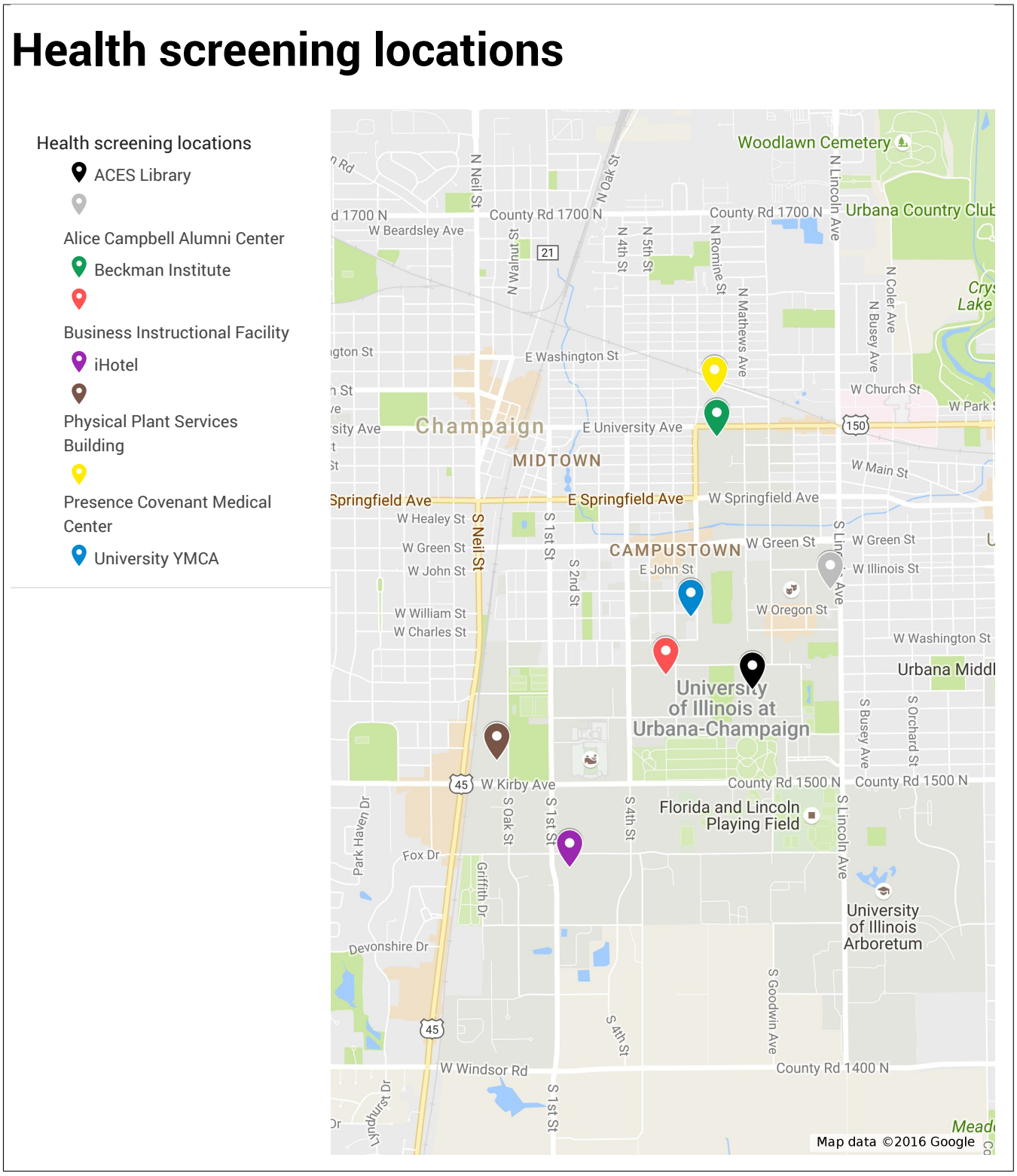


Figure D.12: Main home page for the iThrive website



Notes: This participant was randomly assigned to treatment group C75, and thus is eligible for a total of $\$200 + 2 \times \$75 = 350$ in rewards.

Figure D.13: 2016 screening locations



Notes: This map displays the locations of the 8 different places where health screenings were held in 2016.

Figure D.14: First and second pages of the online appointment application used to sign up for a health screening

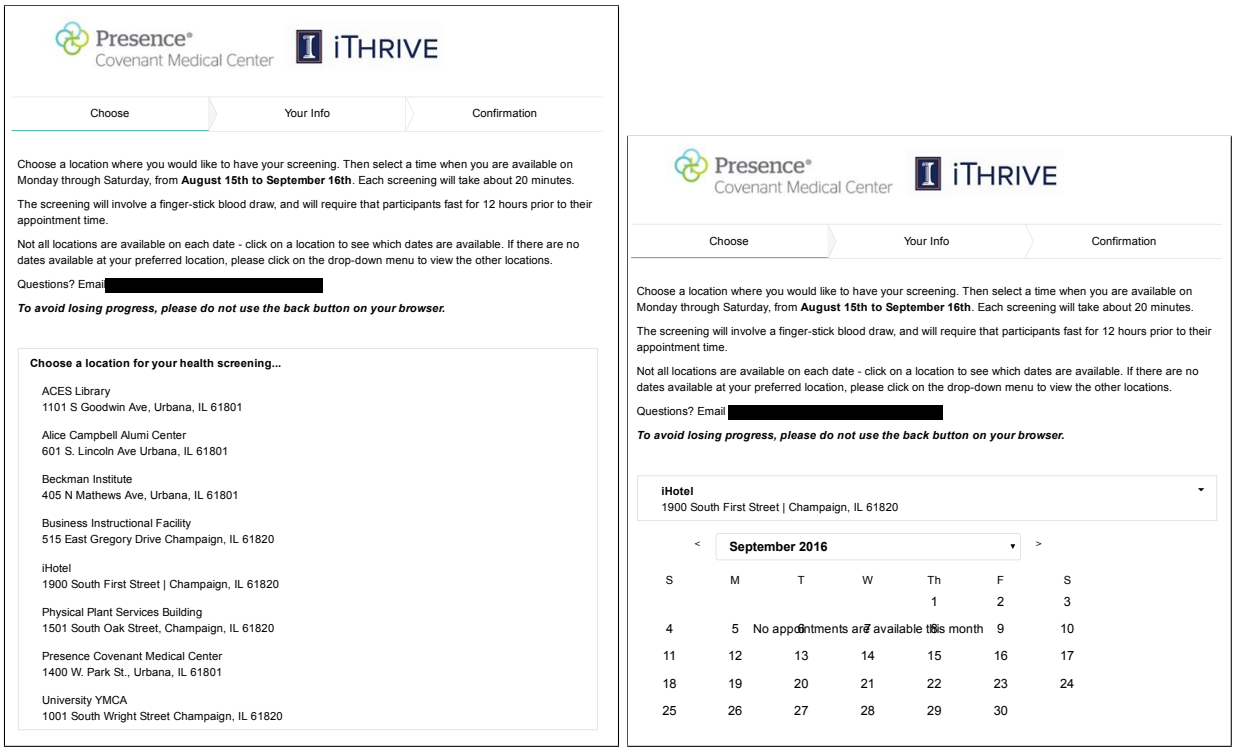
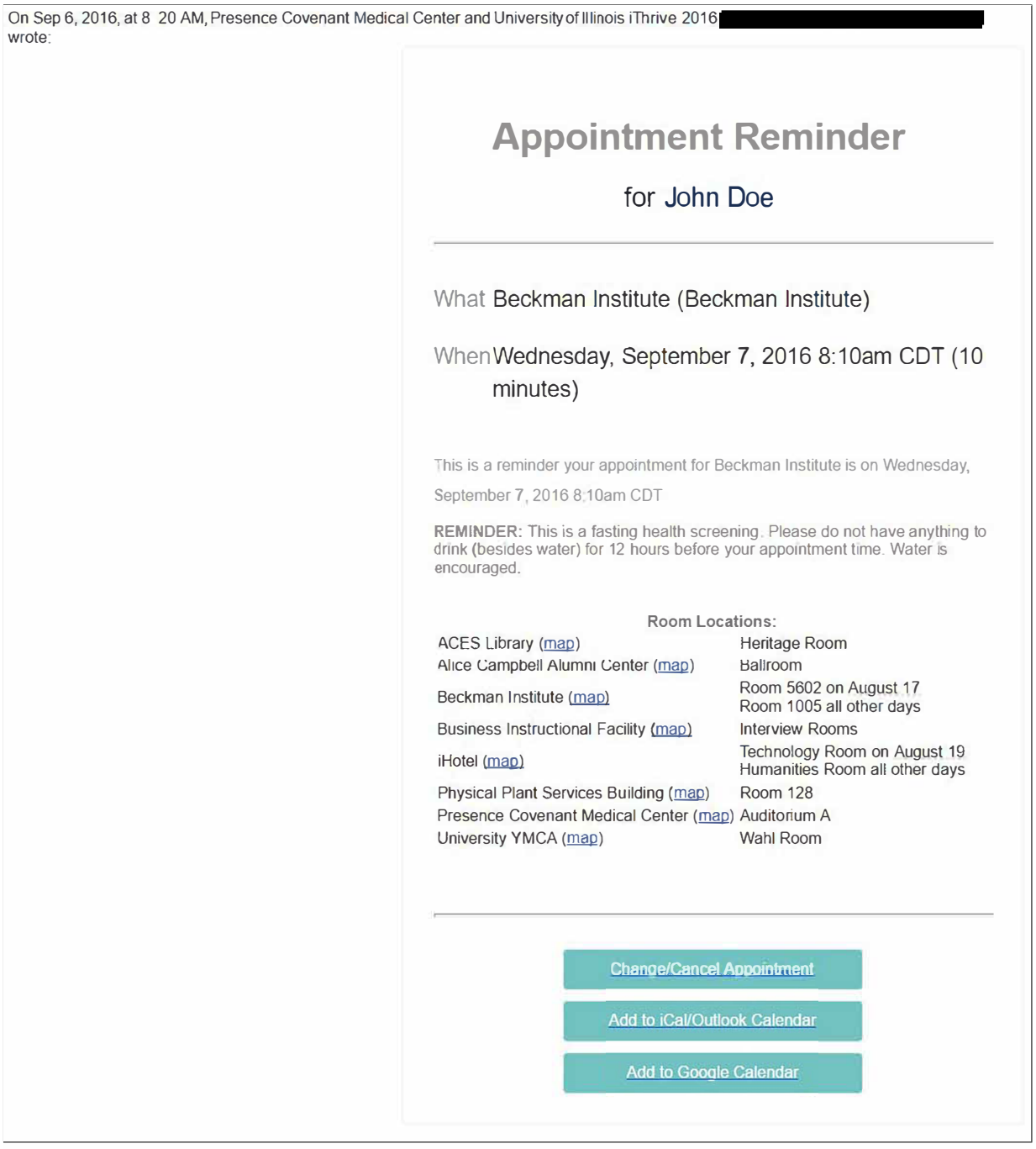


Figure D.15: Example of a reminder email sent out by the online appointment scheduler



On Sep 6, 2016, at 8 20 AM, Presence Covenant Medical Center and University of Illinois iThrive 2016 [redacted] wrote:

Appointment Reminder

for John Doe

What Beckman Institute (Beckman Institute)

When Wednesday, September 7, 2016 8:10am CDT (10 minutes)

This is a reminder your appointment for Beckman Institute is on Wednesday, September 7, 2016 8:10am CDT

REMINDER: This is a fasting health screening. Please do not have anything to drink (besides water) for 12 hours before your appointment time. Water is encouraged.

Room Locations:

ACES Library (map)	Heritage Room
Alice Campbell Alumni Center (map)	Ballroom
Beckman Institute (map)	Room 5602 on August 17 Room 1005 all other days
Business Instructional Facility (map)	Interview Rooms
iHotel (map)	Technology Room on August 19 Humanities Room all other days
Physical Plant Services Building (map)	Room 128
Presence Covenant Medical Center (map)	Auditorium A
University YMCA (map)	Wahl Room

Change/Cancel Appointment

Add to iCal/Outlook Calendar

Add to Google Calendar

Notes: These reminders were delivered one day before the participant's health screening appointment.

Figure D.16: Example of a reminder email sent by the research team to participants one day prior to their health screening

Hello,

You are receiving this email because you are scheduled for an iThrive health screening appointment **tomorrow, September 2nd, at the Funk ACES Library.** The address is as follows:

Funk ACES Library
1101 S Goodwin Ave
Urbana, IL 61801

Tomorrow's health screenings will be held in the **Heritage Room.** Enter the ACES Library from the main entrance. The Heritage Room is located on the main level of ACES, on the West Side of the atrium. Once you enter the building doors, you will continue into the Atrium where the stairs are, and you will see the Heritage Room.

Note: Please do not have anything to eat or drink (besides water) for 12 hours before your appointment time. Water is encouraged.

Please allow about 20-25 minutes for your screening appointment.

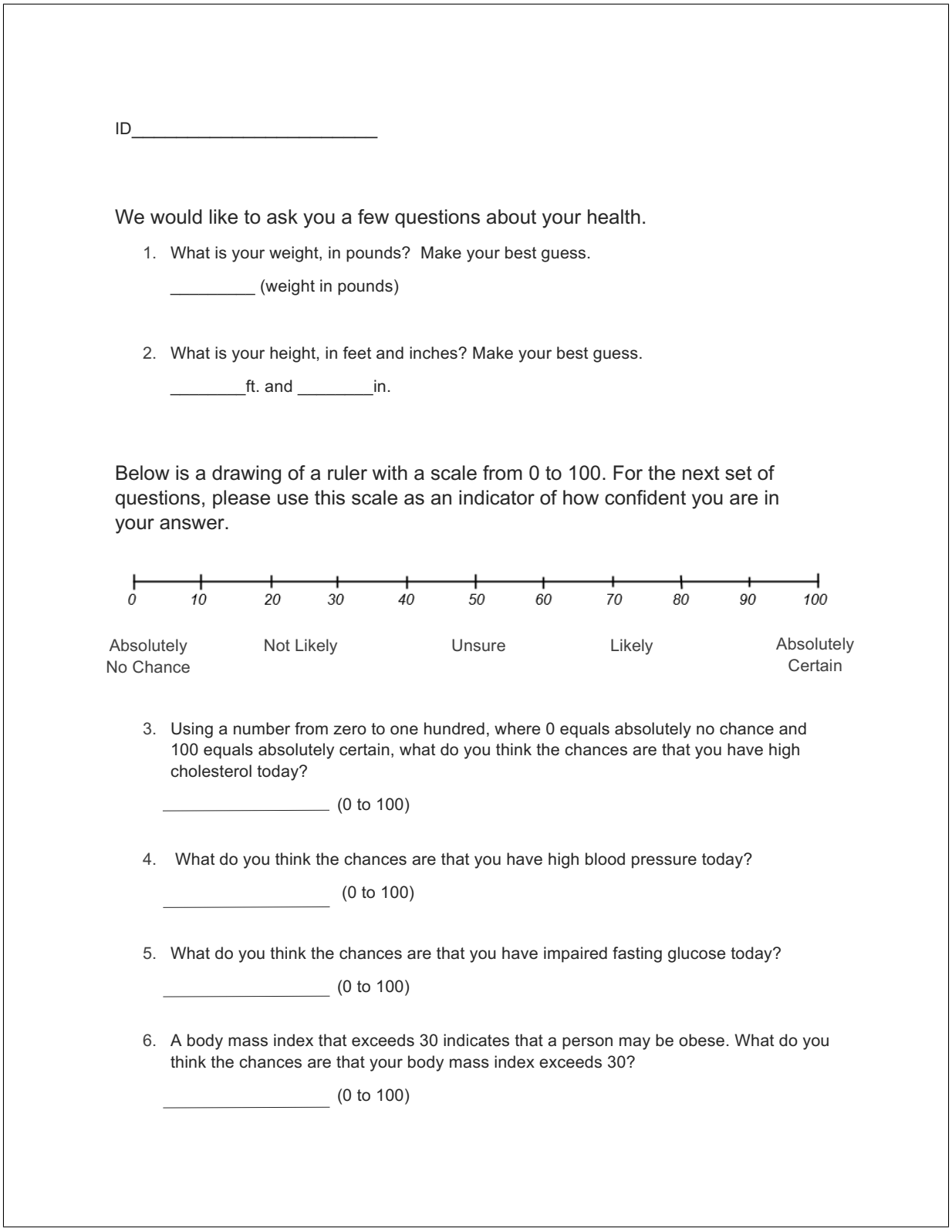
If you have any questions tonight or tomorrow morning, please email [redacted] and we will do our best to respond to your email as soon as possible.

Sincerely,

Lauren Geary

———
Lauren E. Geary
Project Manager || iThrive
University of Illinois at Urbana-Champaign
[redacted]

Figure D.17: Health questionnaire filled out by participants at the health screening



ID_____

We would like to ask you a few questions about your health.

1. What is your weight, in pounds? Make your best guess.

   _____ (weight in pounds)

2. What is your height, in feet and inches? Make your best guess.

   _____ft. and _____in.

Below is a drawing of a ruler with a scale from 0 to 100. For the next set of questions, please use this scale as an indicator of how confident you are in your answer.

Absolutely No Chance | Not Likely | Unsure | Likely | Absolutely Certain

3. Using a number from zero to one hundred, where 0 equals absolutely no chance and 100 equals absolutely certain, what do you think the chances are that you have high cholesterol today?

   _____ (0 to 100)

4. What do you think the chances are that you have high blood pressure today?

   _____ (0 to 100)

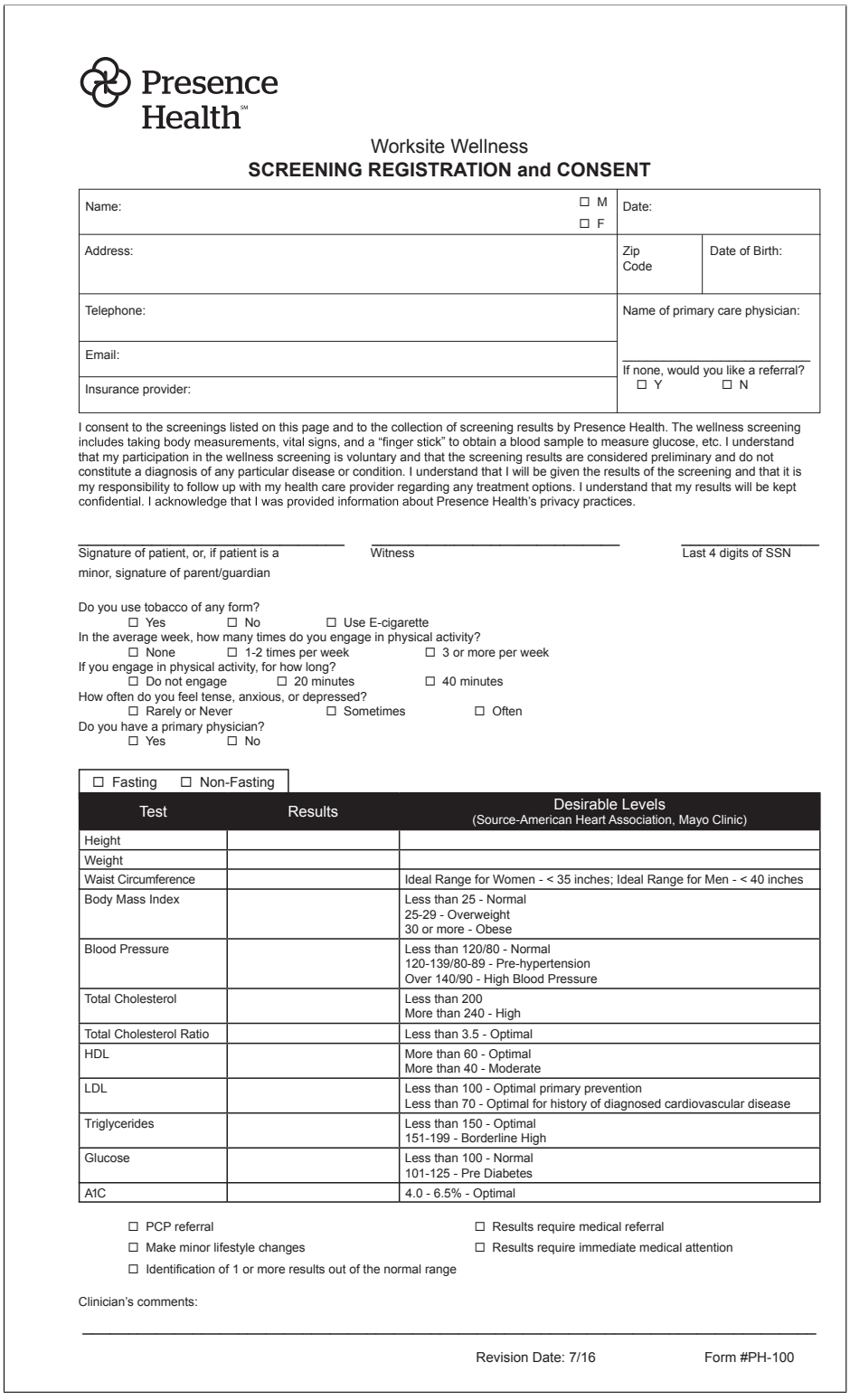
5. What do you think the chances are that you have impaired fasting glucose today?

   _____ (0 to 100)

6. A body mass index that exceeds 30 indicates that a person may be obese. What do you think the chances are that your body mass index exceeds 30?

   _____ (0 to 100)

Figure D.18: Health screening form used by clinicians to record health measures



Presence Health℠

Worksite Wellness

SCREENING REGISTRATION and CONSENT

Name: ☐ M ☐ F	Date:	
Address:	Zip Code	Date of Birth:
Telephone:	Name of primary care physician:	
Email:	If none, would you like a referral? ☐ Y ☐ N	
Insurance provider:		

I consent to the screenings listed on this page and to the collection of screening results by Presence Health. The wellness screening includes taking body measurements, vital signs, and a "finger stick" to obtain a blood sample to measure glucose, etc. I understand that my participation in the wellness screening is voluntary and that the screening results are considered preliminary and do not constitute a diagnosis of any particular disease or condition. I understand that I will be given the results of the screening and that it is my responsibility to follow up with my health care provider regarding any treatment options. I understand that my results will be kept confidential. I acknowledge that I was provided information about Presence Health's privacy practices.

Signature of patient, or, if patient is a minor, signature of parent/guardian _____ Witness _____ Last 4 digits of SSN _____

Do you use tobacco of any form?
☐ Yes ☐ No ☐ Use E-cigarette

In the average week, how many times do you engage in physical activity?
☐ None ☐ 1-2 times per week ☐ 3 or more per week

If you engage in physical activity, for how long?
☐ Do not engage ☐ 20 minutes ☐ 40 minutes

How often do you feel tense, anxious, or depressed?
☐ Rarely or Never ☐ Sometimes ☐ Often

Do you have a primary physician?
☐ Yes ☐ No

☐ Fasting ☐ Non-Fasting

Test	Results	Desirable Levels (Source-American Heart Association, Mayo Clinic)
Height		
Weight		
Waist Circumference		Ideal Range for Women - < 35 inches; Ideal Range for Men - < 40 inches
Body Mass Index		Less than 25 - Normal 25-29 - Overweight 30 or more - Obese
Blood Pressure		Less than 120/80 - Normal 120-139/80-89 - Pre-hypertension Over 140/90 - High Blood Pressure
Total Cholesterol		Less than 200 More than 240 - High
Total Cholesterol Ratio		Less than 3.5 - Optimal
HDL		More than 60 - Optimal More than 40 - Moderate
LDL		Less than 100 - Optimal primary prevention Less than 70 - Optimal for history of diagnosed cardiovascular disease
Triglycerides		Less than 150 - Optimal 151-199 - Borderline High
Glucose		Less than 100 - Normal 101-125 - Pre Diabetes
A1C		4.0 - 6.5% - Optimal

☐ PCP referral
☐ Make minor lifestyle changes
☐ Identification of 1 or more results out of the normal range
☐ Results require medical referral
☐ Results require immediate medical attention

Clinician's comments: _____

Revision Date: 7/16 Form #PH-100

Notes: A carbon copy of this was given to participants upon completion of their health screening in 2016 and in 2017.

Figure D.19: Health coaching guidelines

Increased Blood Pressure (180/100)

1. Does the participant have a history of high blood pressure?

If yes: ask the participant if they are working with their PCP to decrease their blood pressure.

If no: make the patient aware of the damage consistently increased blood pressure has on their body.

Give educational materials.

2. Do they have a primary care provider?

If yes: tell participant to make an appointment with their provider and take the screening form with.

If no: give a list of providers and make the participant aware of the importance.

Increased Glucose (>210 Fasting)

1. Does the participant have a family history of diabetes?

If yes: ask the participant if they are working with their PCP.

If no: make the patient aware of the possibility of diabetes, and the importance of being tested. Give educational materials.

2. Do they have a primary care provider?

If yes: tell participant to make an appointment with their provider and take the screening form with.

If no: give a list of providers and make the participant aware of the importance.

Decreased Glucose (<65)

1. Ask the patient if they are feeling well.

If yes: let them know their glucose levels are low and they may want to eat something.

If no: sit them down immediately, and give them juice and a granola bar.

Increased Triglycerides (>500)

1. Ask the participant if they did indeed fast for 8-12 hours prior to health screening.

If no: then explain the test is not an accurate measurement of triglycerides.

If yes: proceed to step 2.

2. Do they have a primary care provider?

If yes: tell participant to make an appointment with their provider and take the screening form with.

If no: give a list of providers and make the participant aware of the importance.

3. Does the participant have a history of high triglycerides?

If yes: ask the participant if they are working with their PCP to decrease the triglycerides.

If no: make the patient aware of the damage increased triglycerides has on their body.

Give educational materials.

Increased Triglycerides (>500), Increased Total Cholesterol Ratio (>4.0)

1. Ask the participant if they did indeed fast for 8-12 hours prior to health screening.

If no: then explain the test is not an accurate measurement of triglycerides, but there is still concern with the elevated cholesterol ratio.

If yes: proceed to step 2.

2. Do they have a primary care provider?

If yes: tell participant to make an appointment with their provider and take the screening form with.

If no: give a list of providers and make the participant aware of the importance.

3. Does the participant have a family history of heart disease?

If yes: ask the participant if they are working with their PCP to prevent heart disease.

If no: make the patient aware of the damage increased triglycerides and bad cholesterol has on their body.

Give educational materials.

Increased Triglycerides (>500), Increased Total Cholesterol Ratio (>4.0), Increased Blood Pressure

1. Ask the participant if they did indeed fast for 8-12 hours prior to health screening.

If no: then explain the test is not an accurate measurement of triglycerides, but the elevated cholesterol ratio and blood pressure are cause for concern.

If yes: proceed to step 2.

2. Do they have a primary care provider?

If yes: tell participant to make an appointment with their provider and take the screening form with.

If no: give a list of providers and make the participant aware of the importance.

3. Does the participant have a family history of heart disease?

If yes: ask the participant if they are working with their PCP.

If no: make the patient aware their health screening numbers give concern for heart disease. It is essential for the participant to obtain an appointment for further assessment.

Give educational materials, and write a personal note on the screening form that states they need to see a PCP.

Notes: These guidelines were employed by health coaches during their private discussions with study participants immediately following the health screening.

Figure D.20: Postcard given to participants on site after they completing their health screening

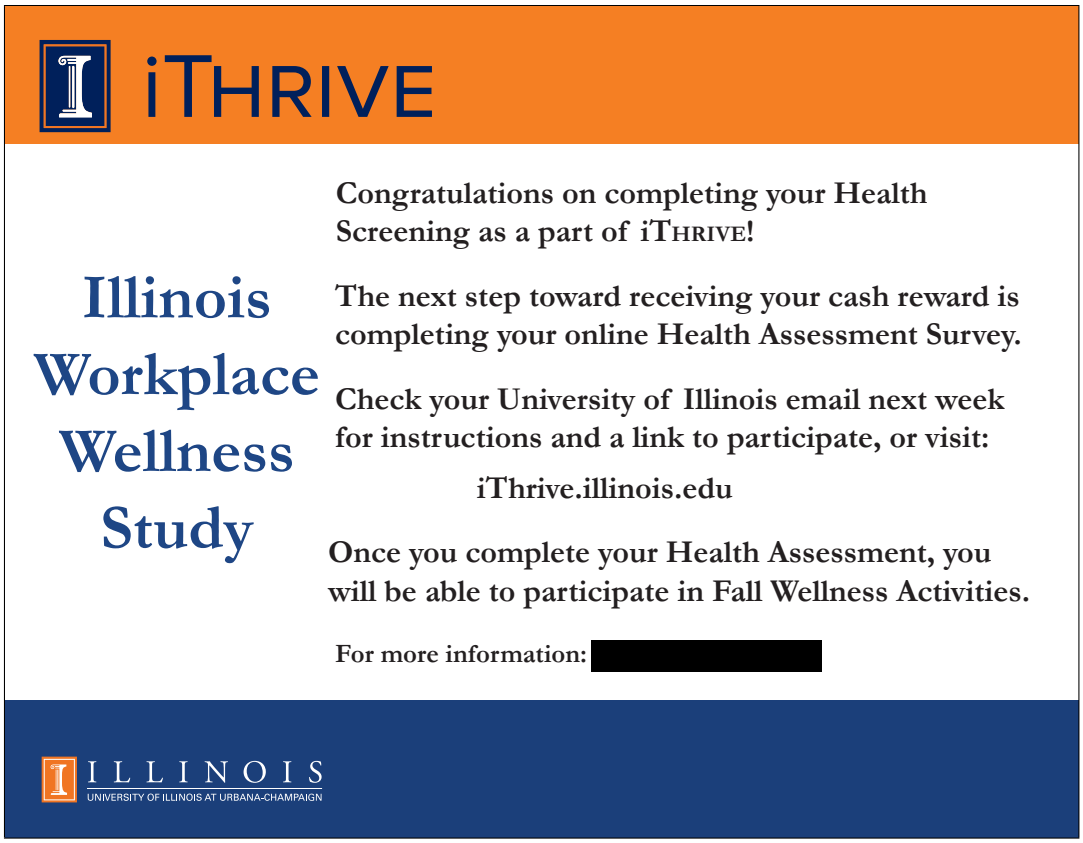


Figure D.21: Email invitation for the 2016 online health risk assessment

From: [redacted]
Subject: iThrive: Health Assessment Survey Invitation

Dear [First Name]:

Congratulations on completing your iThrive health screening! The next step is to complete your online Health Assessment survey, which will provide you with a personalized health summary and suggest practical ways to improve your health.

The Health Assessment survey takes about 12 minutes. After finishing this survey, you will receive a reward of $100 and will be eligible to enroll in wellness activities once registration opens.

To access the online Health Assessment survey, simply copy and paste the following URL into your browser:

ithrive.illinois.edu/healthassessment

You must log in using the following username and initial password:

Username: <username>
Password: <password>

Once you are logged in, you must accept the terms of agreement. Next, click on the "Start New Assessment" button and answer a series of questions. You must click "Finish" when you are done, in order to view your report and to become eligible to enroll in wellness activities.

Please note: Some participants have experienced technical difficulties when taking their surveys. Slow response times or error messages sometimes arise when our survey vendor's servers become overloaded. If you face any technical difficulties while taking the survey, please wait for fifteen minutes and try again later. We are sorry for any inconvenience this might cause for you.

This survey asks questions about seven dimensions of health (i.e., heart health, fitness, nutrition, mental health, diabetes risk, cancer risk, overweight/obesity risk). In order for the software to calculate a personalized wellness score for each dimension, you must answer all of the questions. Your results will give you insights you can use to make goals and plans for health improvement through iThrive programs and activities.

In the consent form you signed at the beginning of this study, you were told that you may refuse to answer any questions and withdraw at any time. This is still true with the Health Assessment, except that if you choose to skip any question in the health assessment, you cannot proceed with the survey. This software limitation only applies to the Health Assessment. If you do not wish to answer all of the survey items, you may withdraw from the study altogether.

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted] or call Lauren Geary, Project Manager, at [redacted].

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: This was sent only to participants who had completed their health screening. The text highlighted in yellow was appropriately customized for each participant.

Figure D.22: Email invitation for Fall 2016 wellness activities

From: [redacted]
Subject: iThrive: Wellness Activity Registration Now Open

Dear [First Name]:

Congratulations on completing your iThrive Health Screening and online Health Assessment survey! You are now eligible to enroll in one of the iThrive Wellness Activities for Fall 2016.

You are free to choose a wellness activity, also called a "track," that best aligns with an area of your health that you would like to improve. These areas include physical activity, weight management, stress management, chronic disease management, and tobacco cessation. You will have the option to participate in classes that meet in-person, or you may choose to participate in one of our online, self-paced programs like HealthTrails.

Completing your chosen wellness track in the Fall will entitle you to a $[X] reward. If you also complete a wellness track in the Spring, you will receive an additional $[X]. You do not have to participate in an activity in the Fall in order to be eligible to participate in the Spring.

To view the set of Wellness Activities that will be offered and to enroll, log in to iThrive by copying and pasting the following URL into your browser:

https://ithrive.illinois.edu/

After you log in to iThrive, click on the "Wellness Activities" tab near the top of your home page. This page lists the different activities available to you. Below each activity is a registration link. Click on the link that corresponds to the activity in which you would like to enroll, select the option to "log in using your netid," and complete the registration form. You will receive a confirmation email when you have completed this step. Please note that you may only sign up for one fall activity.

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted] or call Lauren Geary, Project Manager, at [redacted].

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: This was sent only to participants who had completed their online health risk assessment. The text highlighted in yellow was appropriately customized for each participant.

Figure D.23: Email invitation for Spring 2017 wellness activities

From: [redacted]
Subject: iThrive: Spring Wellness Activity Registration Now Open

Dear [First Name]:

Congratulations on all of your progress in iThrive so far. You are now eligible to enroll in one of the iThrive Wellness Activities for Spring 2017.

You are free to choose a wellness activity that best aligns with an area of your health that you would like to improve. These areas include physical activity, weight management, stress management, chronic disease management, and financial wellness. You will have the option to participate in classes that meet in-person, or you may choose to participate in one of our online, self-paced programs like Spring Into Motion. Note that each activity has a limited capacity, except for Spring Into Motion. Registration will end on Friday, February 10.

Completing your chosen wellness activity in the Spring will entitle you to a $[X] reward. You are able to participate in a Wellness Activity this Spring even if you did not participate in the Fall.

To view the set of Wellness Activities that will be offered and to enroll, log in to iThrive by copying and pasting the following URL into your browser:

https://ithrive.illinois.edu/

After you log in to iThrive, click on the "Wellness Activities" tab near the top of your home page. This page lists the different activities available to you. Below each activity is a registration link. Click on the link that corresponds to the activity in which you would like to enroll, select the option to "log in using your netid," and complete the registration form. Participants with a "@uillinois.edu" email address may need to log in using the "log in using your email" option. You will receive a confirmation email when you have completed this step. Please note that you may only sign up for one Spring activity.

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

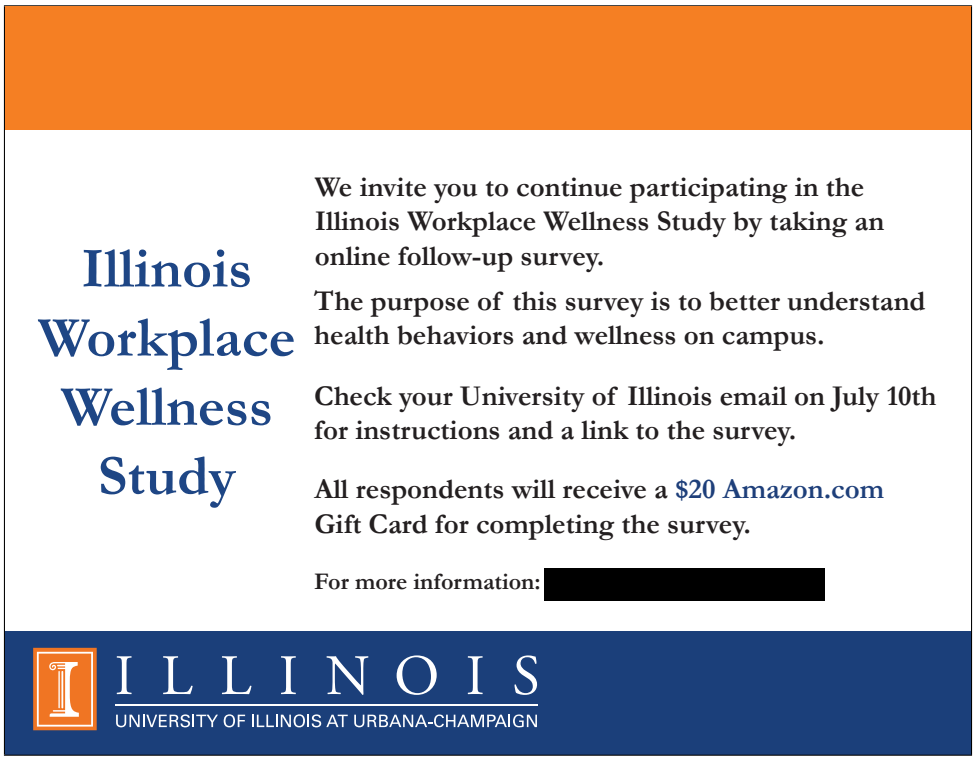
As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted] or call Lauren Geary, Project Manager, at [redacted].

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: This was sent only to participants who had completed their online health risk assessment. The text highlighted in yellow was appropriately customized for each participant.

Figure D.24: Front and back sides of invitation postcard sent on July 6, 2017



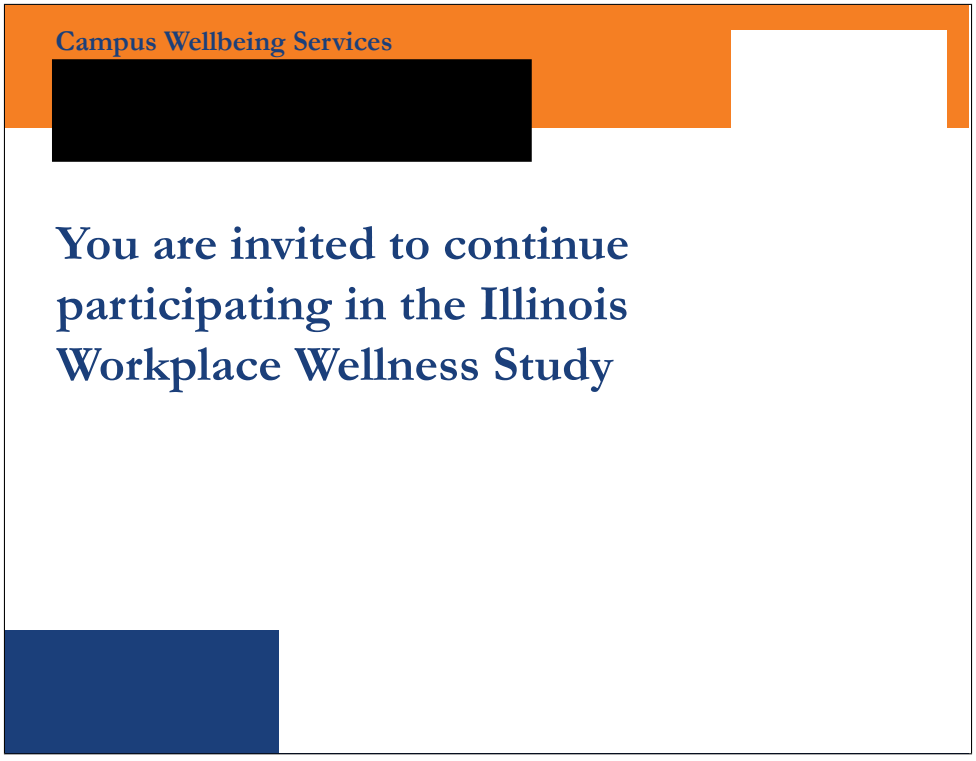


Figure D.25: One-year follow-up survey invitation sent to study participants on July 10, 2017

Dear <FirstName>,

Last summer, you participated in an online survey for the Illinois Workplace Wellness Study. Your participation has allowed the Illinois Workplace Wellness Study Team to conduct important research about workplace wellness programs on the UIUC campus.

We invite you to take part in a second survey for the Illinois Workplace Wellness Study. As before, this online survey includes questions about health behaviors and wellness on campus. The survey will take approximately 15 minutes to complete. We know that your time is valuable, so we are offering a **$20 Amazon.com gift card** to all respondents who complete the survey. This gift card is taxable.

The survey is only available for a limited time, so please complete the survey promptly in order to receive your $20 gift card. To access the online survey, simply copy and paste the following URL in your browser:

<link>

This survey is strictly confidential. **Your individual data will never be shared with the university or your health insurer.**

For non-exempt civil service employees, this program is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

Thank you for contributing to this important research project! If you have any questions or need assistance, please contact us at [redacted] or [redacted].

Best regards,

Illinois Workplace Wellness Study Team

David Molitor
Assistant Professor, Department of Finance

Laura Payne
Professor, Department of Recreation, Sport and Tourism

Julian Reif
Assistant Professor, Department of Finance and IGPA

Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.26: One-year follow-up survey reminder sent on August 2, 2017

From: [redacted]
Subject: $100 gift card drawing: Illinois Workplace Wellness Study

Dear [FIRSTNAME],

We are pleased to announce that those who complete the online survey for the Illinois Workplace Wellness Study will be entered into a drawing to win a $100 Amazon.com gift card.

Ten (10) people who complete the brief survey will be selected at random to receive a $100 Amazon.com gift card. This gift card will be in addition to the $20 Amazon.com gift card that all participants receive for completing the online survey. The drawing for the $100 Amazon.com gift card will occur after the survey closes. Winners will be notified by email.

To access the online survey, simply copy and paste the following URL in your browser:

<personalized study url>

If you have already completed the survey, then you will automatically be entered into the drawing.

If you have any questions or need assistance, please contact us at [redacted] or [redacted]

Best Regards,

Illinois Workplace Wellness Study Team

Notes: The text highlighted in yellow was appropriately customized for each participant. This reminder informed participants for the first time that completing the follow-up survey would enter them into a drawing for an additional $100 reward.

Figure D.27: Text of screening invitation email sent to study participants on August 14, 2017

Dear [First Name]:

You have been selected to participate in the 2017 iThrive Health Screenings. The iThrive Health Screenings are a component of the Illinois Workplace Wellness Study.

The iThrive program offers you the opportunity to participate in a valuable health screening at no cost to you. **In addition, you will earn $125 for completing the iThrive Health Screening.**

The opportunity to participate in the iThrive Health Screening is only available for a limited time. To learn more about iThrive and to sign up for an appointment, visit the iThrive website:

iThrive.illinois.edu

The iThrive Health Screening is summarized below.

Last month, you were invited to take the Illinois Workplace Wellness Study online survey. Even if you did not complete that survey, you are still invited to participate in the health screening. For those of you who took the survey, the random drawing has been completed and the winners have been notified.

---

iThrive Health Screening

You are invited to participate in a free health screening through the iThrive program, beginning on August 21. The purpose of a health screening is to measure physical health characteristics (e.g., height, weight, blood pressure, cholesterol) and use the information as a benchmark for health promotion and management. For your convenience, Presence Health will offer these screenings at various dates and locations across campus. Appointments typically take about 20 to 25 minutes.

Upon completion of the health screening, you will receive a reward of $125.

Scheduling your Health Screening

To schedule your health screening, copy and paste the URL below into your web browser:

https://presencehealth.acuityscheduling.com/

When scheduling your health screening, please use the email address to which this email was sent (**netid@illinois.edu**). This email address will be referred to as your "iThrive contact email".

You may also visit the iThrive website at any time: iThrive.illinois.edu. This website provides personalized information about your progress.

For non-exempt civil service employees, the iThrive Health Screening is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in the iThrive Health Screening is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. You can read here about the purpose of our study as well as the steps we will take to keep your information confidential. If you have any questions or need assistance, please contact us at [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.28: Text of reminder email sent to study participants on September 21, 2017

Dear [First Name]:

This is your **last chance** to attend your free iThrive Health Screening. **The final day to complete your iThrive Health Screening is tomorrow, Friday September 22nd, at Beckman Institute.** To schedule a screening, copy and paste the following URL into your browser:

https://presencehealth.acuityscheduling.com/schedule.php

As a reminder, you will receive a reward of $125 after completing your iThrive Health Screening.

Walk-ins are also encouraged! Stop by Beckman Institute, Room 1005 any time between 6am and 12pm on Friday, September 22nd for an appointment.

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

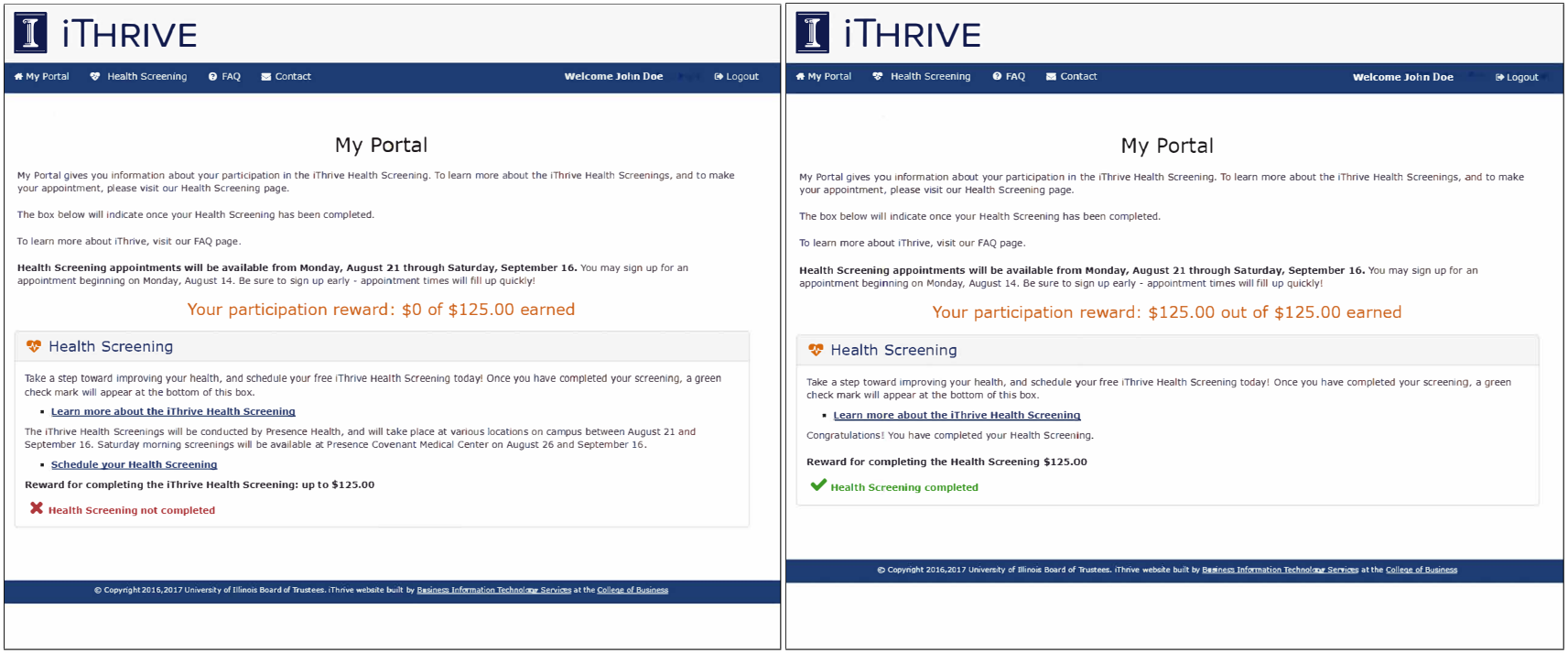
As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

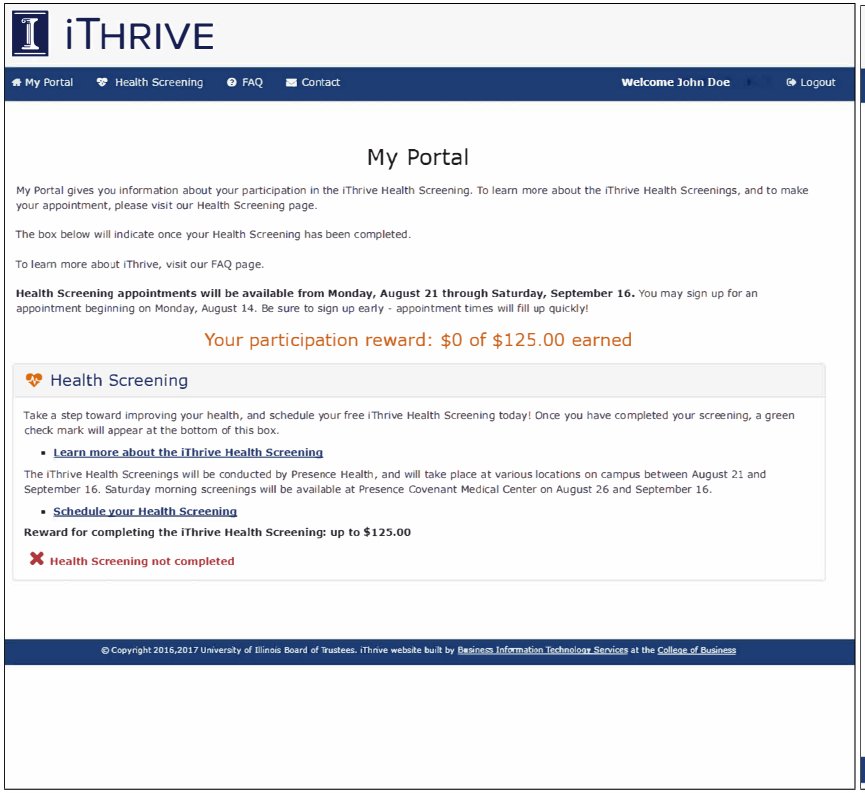
Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.29: Main page for the 2017-2018 iThrive website for a control group member in the $125 screening reward group



Notes: Follow-up screening participants in the $0 reward group did not receive a confirmation email. However, all follow-up screening participants could confirm their completion status on the iThrive website.

Figure D.30: Main page for the 2017-2018 iThrive website for a treatment group member in the $125 screening reward group



Notes: Follow-up screening participants in the $0 reward group did not receive a confirmation email. However, all follow-up screening participants could confirm their completion status on the iThrive website.

Figure D.31: Text of the confirmation email sent to one-year follow-up screening participants in the $125 reward group

From: [redacted]
Subject: Your iThrive Health Screening Payment

Hello,

Congratulations on completing your iThrive Health Screening! Your $125 reward for completion will be processed in October, after the iThrive Health Screenings have ended. The payments will be made through direct deposit, and will be included as part of your regularly scheduled paychecks. As a reminder, these payments are taxable.

You may log in to the iThrive website at https://iThrive.illinois.edu to view your progress at any time.

Please let us know if you have any questions. We will send an email in October after all of the payments have been made.

Yours in good health,

The Illinois Workplace Wellness Study Team

Notes: Follow-up screening participants in the $0 reward group did not receive a confirmation email. However, all follow-up screening participants could confirm their completion status on the iThrive website.

Figure D.32: Email invitation for the 2017 online health risk assessment

Dear [First Name]:

Congratulations on completing your iThrive health screening! The next step is to complete your online Health Assessment survey, which will provide you with a personalized health summary and suggest practical ways to improve your health.

The Health Assessment survey takes about 12 minutes. After finishing this survey, you will be eligible to sign up for Fall 2017 and Spring 2018 iThrive Wellness Activities. **Twenty (20) people who complete a fall activity, and another twenty (20) people who complete a spring activity, will be selected at random to receive a $50 Amazon.com gift card.**

To access the online Health Assessment survey, simply copy and paste the following URL into your browser:

ithrive.illinois.edu/healthassessment

You must log in using the following username and initial password:

Username: <username>
Password: <password>

Once you are logged in, you must accept the terms of agreement. Next, click on the "Start New Assessment" button and answer a series of questions. **Note: Be sure to keep a copy of your iThrive Health Screening results, as you may enter that information into your Health Assessment survey for a more detailed report.** You must click "Finish" when you are done, in order to view your report and to become eligible to enroll in wellness activities.

This survey asks questions about seven dimensions of health (i.e., heart health, fitness, nutrition, mental health, diabetes risk, cancer risk, overweight/obesity risk). In order for the software to calculate a personalized wellness score for each dimension, you must answer all of the questions. Your results will give you insights you can use to make goals and plans for health improvement through iThrive programs and activities.

In the consent form you signed at the beginning of this study, you were told that you may refuse to answer any questions and withdraw at any time. This is still true with the Health Assessment, except that if you choose to skip any question in the health assessment, you cannot proceed with the survey. This software limitation only applies to the Health Assessment. If you do not wish to answer all of the survey items, you may withdraw from the study altogether.

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will <u>never</u> be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted] or call [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: This was sent only to members of the treatment group who had completed their 2017 health screening. The text highlighted in yellow was appropriately customized for each participant.

Figure D.33: Email invitation for Fall 2017 wellness activities

Dear «First_Name»:

Congratulations on completing your iThrive Health Screening and online Health Assessment survey! You are now eligible to enroll in one of the iThrive Wellness Activities for Fall 2017.

For those of you who tried to register at noon, but were unable to do so, we apologize for the inconvenience. The servers where the registration sheets are stored had crashed, but are up and running now.

You are free to choose a wellness activity that best aligns with an area of your health that you would like to improve. These areas include physical activity, weight management, stress management, chronic disease management, and tobacco cessation. You will have the option to participate in classes that meet in-person, or you may choose to participate in one of our online, self-paced programs.

Twenty (20) people who complete a fall activity, and another twenty (20) people who complete a spring activity, will be selected at random to receive a $50 Amazon.com gift card.

To view the set of Wellness Activities that will be offered and to enroll, log in to iThrive by copying and pasting the following URL into your browser:

https://ithrive.illinois.edu/

After you log in to iThrive, click on the "Wellness Activities" tab near the top of your home page. This page lists the different activities available to you. Below each activity is a registration link. Click on the link that corresponds to the activity in which you would like to enroll, select the option to "log in using your netid," and complete the registration form. If you have a "@uillinois.edu" email address, you may need to select the option to "log in using email". You will receive a confirmation email when you have completed this step. **Please note that you may only sign up for one fall activity.**

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted] or call [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: This was sent only to participants who had completed their online health risk assessment. The text highlighted in yellow was appropriately customized for each participant.

Figure D.34: Email invitation for Spring 2018 wellness activities

Dear [First Name],

Congratulations on all of your progress in iThrive so far. You are now eligible to enroll in one of the iThrive Wellness Activities for Spring 2018.

You are free to choose a wellness activity that best aligns with an area of your health that you would like to improve. These areas include physical activity, weight management, stress management, and others. You will have the option to participate in classes that meet in-person, or you may choose to participate in our online, self-paced health challenge – "Keep America Active".

Twenty (20) people who complete a spring activity will be selected at random to receive a $50 Amazon.com Gift Card.

To view the Wellness Activity options that will be offered during the Spring 2018 semester, log in to iThrive by copying and pasting the following URL into your browser:

https://iThrive.illinois.edu

After you log in to iThrive, click the "Wellness Activities" tab near the top of your home page. This page lists the different activities available to you. Below each activity is a registration link. Click on the link that corresponds to the activity in which you would like to enroll, select the option to "log in using your NetID," and complete the registration form. If you have a "@uillinois.edu" email address, you may need to select the option to "log in using email". You will receive a confirmation email when you have completed this step. **Please note that you may only sign up for one Spring 2018 activity.**

For non-exempt civil service employees, iThrive is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

As with every part of the Illinois Workplace Wellness Study, your participation in iThrive is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. If you have any questions or need assistance, please contact us at [redacted] or call [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: This was sent only to participants who had completed their online health risk assessment. The text highlighted in yellow was appropriately customized for each participant.

Figure D.35: Two-year follow-up survey invitation sent to study participants on July 9, 2018

Dear <FirstName>,

Two years ago, you completed an online survey for the Illinois Workplace Wellness Study. Your participation has allowed the Illinois Workplace Wellness Study Team to conduct important research about workplace wellness programs on the UIUC campus.

We invite you to take part in another survey for the Illinois Workplace Wellness Study. As before, this online survey includes questions about health behaviors and wellness on campus. The survey will take approximately 10-15 minutes to complete. We know that your time is valuable, so we are offering a **$20 Amazon.com gift card** to all respondents who complete the survey. This gift card is taxable.

The survey is only available for a limited time, so please complete the survey promptly in order to receive your $20 gift card. To access the online survey, simply copy and paste the following URL in your browser:

<link>

This survey is strictly confidential. **Your individual data will never be shared with the university or your health insurer.**

For non-exempt civil service employees, this program is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

Thank you for contributing to this important research project! If you have any questions or need assistance, please contact us at [redacted]

Best regards,

Illinois Workplace Wellness Study Team

David Molitor
Assistant Professor, Department of Finance

Laura Payne
Professor, Department of Recreation, Sport and Tourism

Julian Reif
Assistant Professor, Department of Finance and IGPA

Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.36: Text of screening invitation email sent to study participants on August 13, 2018

Dear [First Name]:

You have been selected to participate in the 2018 iThrive Health Screenings. The iThrive Health Screenings are a component of the Illinois Workplace Wellness Study.

The iThrive program offers you the opportunity to participate in a valuable health screening at no cost to you. **In addition, you will earn a $75 Amazon.com Gift Card for completing the iThrive Health Screening.**

The opportunity to participate in the iThrive Health Screening is only available for a limited time. To learn more about iThrive and to sign up for an appointment, visit the iThrive website:

iThrive.illinois.edu

The iThrive Health Screening is summarized below.

---

iThrive Health Screening

You are invited to participate in a free health screening through the iThrive program, beginning on August 20, 2018. The purpose of a health screening is to measure physical health characteristics (e.g., height, weight, blood pressure, cholesterol) and use the information as a benchmark for health promotion and management. For your convenience, OSF Heart of Mary Medical Center (formerly Presence Health) will offer these screenings at various dates and locations across campus. Appointments typically take about 20 to 25 minutes.

Upon completion of the health screening, you will receive a reward of a $75 Amazon.com Gift Card. The gift card will be delivered to your University of Illinois email address after the health screenings have ended. You can expect to receive your gift card sometime in late September or early October.

Scheduling your Health Screening

To schedule your health screening, copy and paste the URL below into your web browser:

https://ithrivehealthscreening.as.me/schedule.php

Important! When scheduling your health screening, please use the email address to which this email was sent (**netid@illinois.edu**).

You may also visit the iThrive website at any time: iThrive.illinois.edu. This website provides personalized information about your progress, and highlights important information about the iThrive health screenings.

For non-exempt civil service employees, the iThrive Health Screening is an "approved event," so that, operations permitting and with prior supervisory approval, participation that occurs during an employee's regular work schedule does not require the charging of leave benefit time.

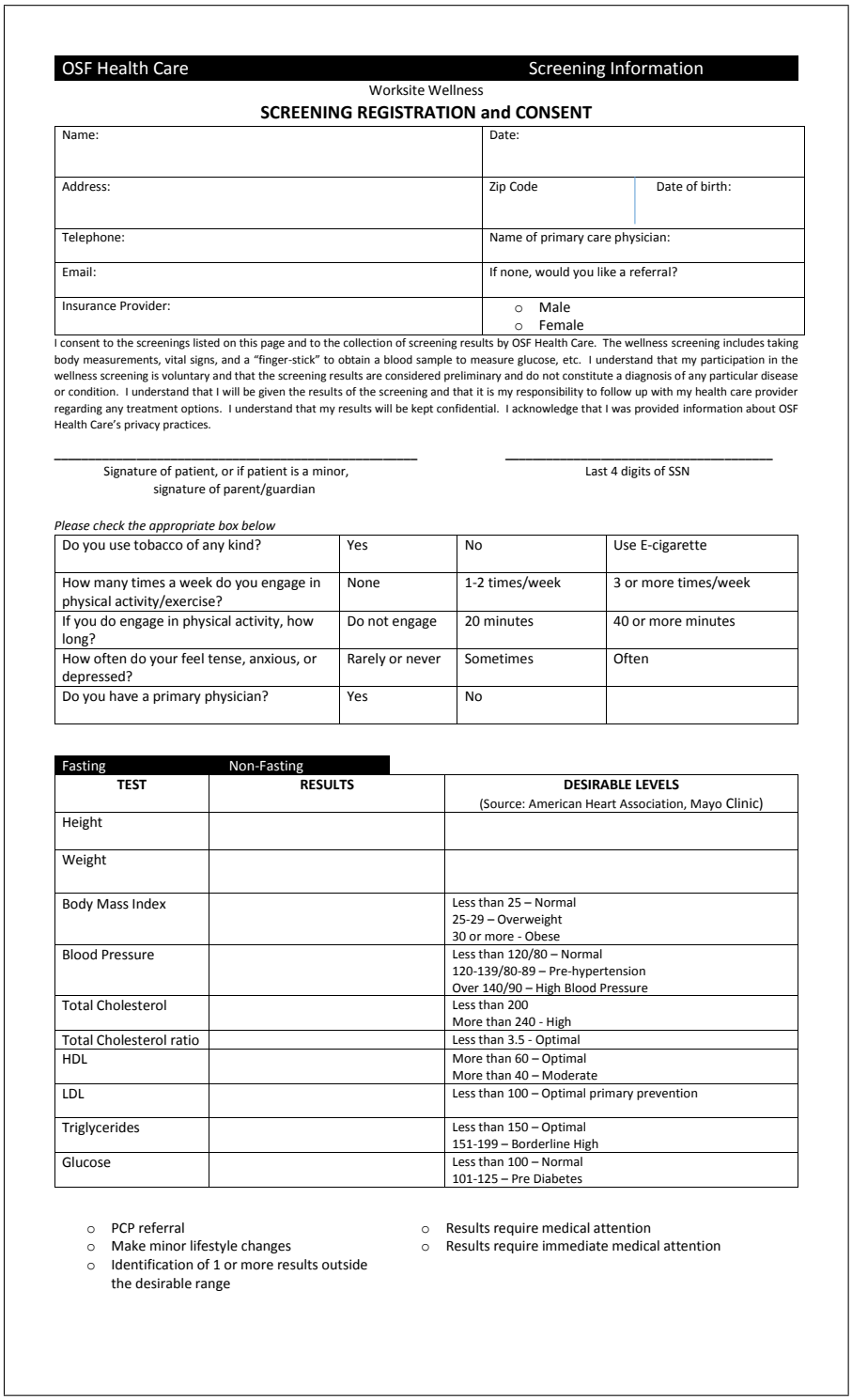
As with every part of the Illinois Workplace Wellness Study, your participation in the iThrive Health Screening is completely voluntary and your **individual data will never be shared with your health insurance provider or your employer**. You can read here about the purpose of our study as well as the steps we will take to keep your information confidential. If you have any questions or need assistance, please contact us at [redacted]

Yours in good health,

Illinois Workplace Wellness Study Team

Notes: The text highlighted in yellow was appropriately customized for each participant.

Figure D.37: Copy of 2018 health screening form used by clinicians to record health measures



OSF Health Care — Screening Information

Worksite Wellness

SCREENING REGISTRATION and CONSENT

Name:	Date:	
Address:	Zip Code	Date of birth:
Telephone:	Name of primary care physician:	
Email:	If none, would you like a referral?	
Insurance Provider:	o Male o Female	

I consent to the screenings listed on this page and to the collection of screening results by OSF Health Care. The wellness screening includes taking body measurements, vital signs, and a "finger-stick" to obtain a blood sample to measure glucose, etc. I understand that my participation in the wellness screening is voluntary and that the screening results are considered preliminary and do not constitute a diagnosis of any particular disease or condition. I understand that I will be given the results of the screening and that it is my responsibility to follow up with my health care provider regarding any treatment options. I understand that my results will be kept confidential. I acknowledge that I was provided information about OSF Health Care's privacy practices.

_____ _____

Signature of patient, or if patient is a minor, signature of parent/guardian — Last 4 digits of SSN

Please check the appropriate box below

Do you use tobacco of any kind?	Yes	No	Use E-cigarette
How many times a week do you engage in physical activity/exercise?	None	1-2 times/week	3 or more times/week
If you do engage in physical activity, how long?	Do not engage	20 minutes	40 or more minutes
How often do your feel tense, anxious, or depressed?	Rarely or never	Sometimes	Often
Do you have a primary physician?	Yes	No	

Fasting — Non-Fasting

TEST	RESULTS	DESIRABLE LEVELS (Source: American Heart Association, Mayo Clinic)
Height		
Weight		
Body Mass Index		Less than 25 – Normal 25-29 – Overweight 30 or more - Obese
Blood Pressure		Less than 120/80 – Normal 120-139/80-89 – Pre-hypertension Over 140/90 – High Blood Pressure
Total Cholesterol		Less than 200 More than 240 - High
Total Cholesterol ratio		Less than 3.5 - Optimal
HDL		More than 60 – Optimal More than 40 – Moderate
LDL		Less than 100 – Optimal primary prevention
Triglycerides		Less than 150 – Optimal 151-199 – Borderline High
Glucose		Less than 100 – Normal 101-125 – Pre Diabetes

- o PCP referral
- o Make minor lifestyle changes
- o Identification of 1 or more results outside the desirable range
- o Results require medical attention
- o Results require immediate medical attention

Notes: A carbon copy of this was given to participants upon completion of their health screening in 2018.

D.4 Online Appendix Tables

Table D.1: Dates, locations, times, and number of health screenings performed in 2016

Date	Location	Appt Times	Capacity	Appts scheduled	Total Screened
Monday, August 15	Business Instructional Facility	6:00am - 10:20am	108	67	69
Tuesday, August 16	Business Instructional Facility	6:00am - 10:20am	108	66	65
Wednesday, August 17	Beckman Institute	6:00am - 10:20am	108	89	90
Thursday, August 18	Physical Plant Services Building	7:45am - 10:15am	64	58	57
Friday, August 19	iHotel	6:00am - 10:20am	108	91	93
Saturday, August 20	Presence Covenant Medical Center	7:00am - 10:20am	84	74	76
Monday, August 22	iHotel	6:00am - 10:20am	108	99	92
Tuesday, August 23	Business Instructional Facility	6:00am - 10:50am	120	75	75
Wednesday, August 24	Business Instructional Facility	6:00am - 10:50am	120	77	74
Thursday, August 25	Alice Campbell Alumni Center	7:45am - 10:55am	80	74	77
Friday, August 26	Beckman Institute	6:00am - 10:50am	120	100	94
Saturday, August 27	Presence Covenant Medical Center	7:00am - 9:50am	72	52	45
Monday, August 29	Beckman Institute	6:00am - 10:55am	120	97	90
Tuesday, August 30	iHotel	6:00am - 10:55am	120	109	104
Wednesday, August 31	University YMCA	6:00am - 10:50am	120	98	94
Thursday, September 1	University YMCA	6:00am - 10:50am	120	78	71
Friday, September 2	ACES Library	8:15am - 10:55am	68	66	60
Saturday, September 3	N/A	N/A	N/A	N/A	N/A
Monday, Septermber 5	N/A	N/A	N/A	N/A	N/A
Tuesday, September 6	iHotel	6:00am - 10:50am	120	117	99
Wednesday, September 7	Beckman Institute	6:00am - 10:50am	120	87	76
Thursday, September 8	University YMCA	6:00am - 10:50am	120	92	81
Friday, September 9	University YMCA	6:00am - 10:50am	120	66	55
Saturday, September 10	Presence Covenant Medical Center	7:00am - 9:50am	72	26	17
Monday, September 12	iHotel	6:00am - 10:50am	61	52	45
Tuesday, September 13	iHotel	6:00am - 10:50am	75	53	45
Wednesday, September 14	iHotel	6:00am - 10:50am	76	58	53
Thursday, September 15	iHotel	6:00am - 10:50am	76	50	42
Friday, September 16	iHotel	6:00am - 10:50am	76	76	61
Total			**2,664**	**2,047**	**1,900**

Table D.2: Description of and statistics for the Fall 2016 wellness activities

	Number of classes	Time and day of week	Start date	End date	Reward requirement	Capacity	Registered	Completed	Description
Freedom from Smoking	1	N/A	10/17/16	12/16/16	8 weekly calls	20	17	9	The Illinois Freedom from Smoking HelpLine is a one-on-one telephonic coaching program to help participants to quit tobacco for good. Participants are matched with a trained cessation expert. Quitline cessation specialists offer participants expert advice, an assessment of your tobacco treatment, and help you develop a customized quit-plan. Calls take place weekly, and are scheduled at your convenience.
HealthTrails	Unlimited	N/A	10/10/16	12/4/16	400 virtual miles	Unlimited	1027	715	HealthTrails is an eight-week self-paced, online wellness activity developed by Health Enhancement Systems – a leader in online wellness campaigns. This program allows participants to virtually travel along famous trails as they practice and record healthy lifestyle behaviors such as physical activity, nutrition, and stress management. HealthTrails is includes the option of a mobile application that allows participants to conveniently track their behaviors using their cell phone or other mobile device. The program incorporates challenging wellness goals and fun themes, as well as daily tips throughout the program. Participants who choose to register for HealthTrails can work to improve their health in the areas of: * Physical Activity * Stress Management * Healthy Eating
Live Well Be Well	1	5:15pm - 7:15pm (R)	10/13/16	11/17/16	Attend 5 of 6 classes	20	19	16	Live Well, Be Well is a six-week evidence-based chronic disease self-management program that was developed by Stanford University. This interactive program has been shown empowers participants through learning important lifestyle skills that enhance one's ability to effectively manage ongoing health conditions. This program is open to anyone with an ongoing health condition such as arthritis, heart disease, asthma, lung disease, diabetes, osteoporosis, cancer or any other. Caregivers may also participate. The program is taught by certified facilitators Cheri Burcham and Chelsey Byers, University of Illinois Extension community health educators.
Prudential Pathways	1	5:15pm - 6:15pm (R)	10/13/16	11/10/16	Attend 5 of 5 classes	25	25	20	The Prudential Pathways program offers practical, down-to-earth financial information. Participants will gain an understanding of the fundamentals of financial wellness, and personal financial planning. Prudential Pathways will be facilitated by Peggy Furlong with Prudential Financial, and will cover important topics such as: setting your financial goals, protecting your assets through risk management, investment principles, healthcare planning, retirement and asset distribution planning, tax strategies, estate planning strategies, how your employee benefits fit into your overall financial wellness, and more.
Recess for Adults	2	5:15pm - 6:00pm (W), 6:30pm - 7:15pm (W)	10/12/16	12/7/16	Attend 6 of 8 classes	50	49	28	Recess For Adults is an eight-week program inspired by games typically seen on a playground. This program is perfect for adults to increase their physical activity levels, and to have fun together. A typical class agenda could include, for example, "Red Light, Green Light", "Crazy Kickball", "Blob Tag", and "Group Juggle". This program meets once per week for 45 minutes, for eight weeks. The program will be led by instructor Kerri Schiller, a University of Illinois PhD student in Recreation, Sport, and Tourism.
Stress Management	1	5:15pm - 6:15pm (W)	10/19/16	12/14/16	Attend 6 of 8 classes	40	40	27	This eight-week program provides participants with the knowledge and skills to effectively manage stress in their lives. Participants gain an understanding of how stress affects them. They build awareness of their personal stressors and stress symptoms, of their ability to control how stress affects them, and how to address stress. The program is very interactive; in each session participants learn practical skills they can use in their daily lives. Topics include defining stress, overcoming stressful thought patterns, relaxation techniques, managing stress at work, coping with change, and more. The program is facilitated by Michele Guerra, the Director of the UI Wellness Center.
Tai Chi	3	5:15pm - 6:15pm (T), 6:30pm - 7:30pm (T, R)	10/11/16	12/8/16	Attend 6 of 8 classes	60	60	39	Tai Chi for Relaxation is an eight-week program that aims to improve overall health and wellness through learning basic Tai Chi movements and techniques. The class is taught by local certified Tai Chi instructor Rick Krandel, who maintains certification from the Tai Chi for Health Institute. Three sessions of Tai Chi for Relaxation are scheduled this fall. You may select either the Tuesday evening or Thursday evening sessions.
Weight Watchers at Work	2	12:00pm-12:50pm (W,R)	10/12/16	12/8/16	Attend 6 of 8 classes	32	32	27	Weight Watchers at Work is an eight-week weight management program, that aims to help participants to develop skills to unlock their inner strength to make healthy choices for life. Participants will learn how to see food as a fuel for a healthy life, and to find ways to move more each day. The SmartPoints plan assigns a point value to every food, and members are given a target number of points for each day. Participants can make their own choices about what foods to eat to reach their daily target number of points. Weight Watchers at Work will meet on Wednesdays and Thursdays from 12pm to 1pm.
Well at Work	1	12:00pm-12:50pm (M)	10/10/16	12/5/16	Attend 6 of 8 classes	35	35	22	The Well at Work Series is an eight-week program that provides participants with practical tips on how to stay healthy at work. Each session will focus on a different aspect of workplace wellness. The brief lunch and learn format is conveniently scheduled to increase employees' ability to attend. Facilitator Michele Guerra, the Director of the UI Wellness Center, will cover a variety of workplace health-related topics, including how to: fit physical activity in at work, eat healthfullly at work, achieve work-life balance, get a good night's sleep, stay energized during the work day, relax during stressful moments, and more.
Total							**1,304**	**903**	

Table D.3: Description of and statistics for the Spring 2017 wellness activities

	Number of classes	Time and day of week	Start date	End date	Reward requirement	Capacity	Registered	Completed	Description
Active Living Every Day	1	5:15pm - 6:15pm (T)	1/31/2017	4/25/2017	Attend 9 out of 12 classes	30	12	9	Active Living Every Day (ALED) helps people become and stay physically active. ALED focuses on lifestyle physical activity into one's life and life management skills. Participants will be provided with a step-by-step process to create their own healthy lifestyle. They will learn a wide variety of life skills, including: *Setting goals *Overcoming challenges *Defusing stress *Making lasting changes, and more ALED is perfect for inactive people, or those who want to be more active, but are having difficulty doing so. Note: This is not an exercise class.
Adventures in Financial Wellness	1	5:15pm - 6:15pm (R)	2/16/2017	4/13/2017	Attend 6 out of 8 classes	36	36	21	Looking to expand or deepen your financial savvy? Sign up for Adventures in Financial Wellness. Each week, Prudential financial professionals* will provide practical information on a different financial wellness topic. Participants will gain a better working knowledge of credit, banking services, saving, investing, and funding college, taxes, life insurance and retirement planning. This program is different from the Pathways program we offered in the fall. Some information may be similar. *No Prudential financial products will be sold or promoted during this series.
Healthy Weigh	1	5:15pm - 6:15pm (W)	2/8/2017	4/5/2017	Attend 6 out of 8 classes	40	28	17	Are you looking for a safe and effective weight management program? Join the Healthy Weigh! Healthy Weigh is the UI Wellness Center's weight management program. Healthy Weigh equips participants with proper tools to lose weight safely and effectively. This program is not a diet. Participants will: *Learn how to lose and maintain a healthy weight *Attain life management skills to help them attain their weight goals *Receive group support to increase self-confidence
Live Well Be Well	1	5:15pm - 7:15pm (W)	2/22/2017	4/12/2017	Attend 5 out of 7 classes	20	9	3	Live Well, Be Well is a six-week evidence-based chronic disease self-management program that was developed by Stanford University. This interactive program has been shown empowers participants through learning important lifestyle skills that enhance one's ability to effectively manage ongoing health conditions. This program is open to anyone with an ongoing health condition such as arthritis, heart disease, asthma, lung disease, diabetes, osteoporosis, cancer or any other. Caregivers may also participate. The program is taught by certified facilitators Cheri Burcham and Chelsey Byers, University of Illinois Extension community health educators.
Lunchtime Walk	1	12:10pm - 12:55pm (M)	2/27/2017	4/24/2017	Attend 6 out of 8 sessions	35	34	21	Do you want to get more physical activity, but can't seem to find the time? It just got easier to fit in a walk during your busy day. Sign up for our Lunchtime Walk program. These walks are designed to fit into the average lunch break, allowing enough time to travel to and from the starting point, get a 30-minute walk, and return to your work area. The first three walks will be inside; once the weather warms up a bit, we will walk outside. Walkers of all abilities are welcome.
Mini Stress Relievers	1	12:10pm - 12:55pm (T)	2/14/2017	4/11/2017	Attend 6 out of 8 classes	35	35	28	Need some "me time"? Join our Mini Stress Relievers program! Each week we will feature an easy-to-do stress reduction activity. Examples of activities include: *Coloring *Practicing muscle relaxation techniques *Taking a contemplative walk *Experiencing the power of aromatherapy *And more! You will also have the opportunity to meet other campus employees in a relaxing atmosphere.
Recess for Adults	1	5:15pm - 6:00pm (W)	2/8/2017	4/5/2017	Attend 6 of 8 classes	25	25	15	Recess For Adults is an eight-week program inspired by games typically seen on a playground. This program is perfect for adults to increase their physical activity levels, and to have fun together. A typical class agenda could include, for example, "Red Light, Green Light", "Crazy Kickball", "Blob Tag", and "Group Juggle". This program meets once per week for 45 minutes, for eight weeks. The program will be led by instructor Kerri Schiller, a University of Illinois PhD student in Recreation, Sport, and Tourism.
Spring Into Motion	N/A	N/A	2/6/2017	4/2/2017	Obtain 40 "Springer Icons" (6,000 steps per day or 30 minutes of physical activity per day for 40 days)	Unlimited	808	588	Spring Into Motion is an online, self-paced wellness activity that encourages participants to be more active. The program allows participants to track either their steps or physical activity minutes each day, making progress toward a final goal. As they track their activity, participants progress through different, exciting spring events all around the world. This program is great for participants of all fitness levels. Whether you are just starting out, or have a well-established physical activity routine, Spring Into Motion will help to boost energy and improve health. For user convenience, a mobile application is also available to help with on-the-go activity tracking. Participants who own a FitBit or a Jawbone device will have the ability to sync their devices with their Spring Into Motion accounts, allowing for automatic activity tracking. Participants will strive to reach a goal of at least 6,000 steps per day or 30 minutes of physical activity per day, for at least 40 days throughout the program.
Tai Chi	3	6:30pm - 7:30pm (T), 6:30pm - 7:30pm (T, R)	2/7/2017	4/6/2017	Attend 6 of 8 classes	60	60	27	Tai Chi for is an eight-week program that aims to improve overall health and wellness through learning basic Tai Chi movements and techniques. The class is taught by local certified Tai Chi instructor Rick Krandel, who maintains certification from the Tai Chi for Health Institute. Two sessions of Tai Chi for Relaxation are scheduled this fall. You may select either the Tuesday evening or Thursday evening sessions.
Tai Chi (Advanced)	1	5:15pm - 6:15pm (T)	2/7/2017	4/4/2017	Attend 6 of 8 classes	20	12	11	Tai Chi Extension Movements is an eight-week program that aims to improve overall health and wellness through Tai Chi movements. We will be offering the Extension Movements class as an advanced section of Tai Chi, where the instructor will be teaching additional postures that were not covered in the first semester sessions. This class has a limited capacity, and is only open to participants who successfully completed an introductory Tai Chi program in the Fall (attended at least 6 of the 8 sessions).
Total							**1,059**	**740**	

Table D.4: Dates, locations, times, and number of health screenings performed in 2017

Date	Location	Appt Times	Capacity	Appts scheduled	Total Screened
Monday, August 21	Business Instructional Facility	6:00am - 11:20am, 12:40pm - 4:00pm	208	62	57
Tuesday, August 22	Beckman Institute	6:00am - 11:20am, 12:40pm - 4:00pm	208	152	138
Wednesday, August 23	Business Instructional Facility	6:00am - 11:20am, 12:40pm - 4:00pm	208	70	65
Thursday, August 24	University YMCA	6:00am - 11:20am, 12:40pm - 4:00pm	208	106	97
Friday, August 25	iHotel	6:00am - 11:20am, 12:40pm - 4:00pm	208	178	154
Saturday, August 26	Presence Covenant Medical Center	7:00am - 10:50am	96	74	67
Monday, August 28	Alice Campbell Alumni Center	7:45am - 11:15am, 12:40pm - 4:00pm	168	112	96
Tuesday, August 29	Business Instructional Facility	6:00am - 11:20am, 12:40pm - 4:00pm	208	75	63
Wednesday, August 30	ACES Library	7:45am - 11:15am, 12:40pm - 4:00pm	168	126	120
Thursday, August 31	iHotel	6:00am - 11:20am, 12:40pm - 4:00pm	208	148	138
Friday, September 1	Beckman Institute	6:00am - 11:20am, 12:40pm - 4:00pm	208	38	34
Saturday, September 2	N/A	N/A			
Monday, September 4	N/A	N/A			
Tuesday, September 5	iHotel	6:00am - 11:20am, 12:40pm - 4:00pm	208	87	75
Wednesday, September 6	Alice Campbell Alumni Center	7:45am - 11:15am, 12:40pm - 4:00pm	168	75	68
Thursday, September 7	iHotel	6:00am - 11:20am, 12:40pm - 4:00pm	208	100	85
Friday, September 8	University YMCA	6:00am - 11:20am, 12:40pm - 4:00pm	208	84	77
Saturday, September 9	N/A	N/A			
Monday, September 11	Beckman Institute	6:00am - 11:20am, 12:40pm - 4:00pm	208	101	93
Tuesday, September 12	iHotel	6:00am - 11:20am, 12:40pm - 4:00pm	208	90	82
Wednesday, September 13	University YMCA	6:00am - 11:20am, 12:40pm - 4:00pm	208	58	53
Thursday, September 14	Beckman Institute	6:00am - 11:20am, 12:40pm - 4:00pm	208	85	79
Friday, September 15	University YMCA	6:00am - 11:20am, 12:40pm - 4:00pm	208	67	58
Saturday, September 16	Presence Covenant Medical Center	7:00am - 10:50am	96	35	27
Monday, September 18	iHotel	6:00am - 11:20am	128	48	44
Tuesday, September 19	iHotel	6:00am - 11:20am	128	42	38
Wednesday, September 20	iHotel	6:00am - 11:20am	128	69	61
Thursday, September 21	University YMCA	6:00am - 11:20am	128	48	45
Friday, September 22	Beckman Institute	6:00am - 12:10pm	156	90	90
Total			**4,692**	**2,220**	**2,004**

Table D.5: Description of and statistics for the Fall 2017 wellness activities

	Number of classes	Time and day of week	Start date	End date	Reward requirement	Capacity	Registered	Completed	Description
Freedom from Smoking	1	5:15pm - 6:15pm (T)	10/17/2017	12/5/2017	Attend 6 out of 8 classes	20	2	2	Have you wanted to quit tobacco but need help and support? Have you tried to quit before unsuccessfully? Increase your chances of quitting for good with the Freedom from Smoking program. Freedom from Smoking is a unique program based on proven addiction and behavior change models. The program offers a structured, systematic approach to quitting. It has a positive focus, with an emphasis on the benefits of better health. Because no one cessation technique is effective for everyone, participants learn a wide variety of evidence-based cessation techniques. Participants address the physical, mental, and social aspects of their addiction. Freedom from Smoking features: *A small group setting that provides peer support and personalized attention *A variety of quit techniques that allow participants to create a quit plan that works for them *An evidence-based approach that increases chances of success *A self-help manual that compliments group sessions.
Full Body Fusion - Group Fitness Class	1	5:15pm - 6:15pm (M)	10/16/2017	12/11/2017	Attend 6 out of 8 classes	25	23	16	Are you looking to improve your overall fitness in a minimum amount of time? Then Full Body Fusion may be for you! Full Body Fusion is an interval training style class that maximizes fun and results. Full Body Fusion will be taught by Kristen Plemons. Kristen is a certified group fitness instructor, and instructs various physical activity programs throughout the Champaign-Urbana community. What is interval training? Interval training is a complete physical activity program. It combines various types of fitness activities in one class. Participants alternate between vigorous activity that increases their heart rate, and muscle strengthening exercises. The result is improvement in a number of fitness areas in less time than in a traditional fitness class. Who is Full Body Fusion for? Full Body Fusion is a strenuous class. It is designed for people who are at least moderately fit, and can exercise at a vigorous level. Participants can work at their own level during the class and make modifications to exercises as necessary, but this may not be the most beneficial option for a beginner. Interval training can carry risks for people with musculoskeletal injuries or heart disease. If you have any of these conditions, please check with your primary care provider before signing up.
Lunchtime Walk	1	12:10pm - 12:55pm (Th)	10/19/2017	12/14/2017	Attend 6 out of 8 sessions	35	22	8	Do you want to get more physical activity, but can't seem to find the time? It just got easier to fit in a walk during your busy day. Sign up for our Lunchtime Walk program. These walks are designed to fit into the average lunch break, allowing enough time to travel to and from the starting point, get a 30-minute walk, and return to your work area. All walks will be outside, weather permitting. In the event of inclement weather, we will walk on the track in the UI Armory.
Mini Stress Relievers	1	12:10pm - 12:55pm (W)	10/18/2017	12/13/2017	Attend 6 out of 8 classes	35	35	16	Need some "me time"? Join our Mini Stress Relievers program! Each week we will feature an easy-to-do stress reduction activity. Examples of activities include: *Coloring *Practicing muscle relaxation techniques *Taking a contemplative walk *Experiencing the power of aromatherapy *And more! You will also have the opportunity to meet other campus employees in a relaxing atmosphere.
Recess for Adults	1	5:15pm - 6:00pm (T)	10/17/2017	12/12/2017	Attend 6 of 8 classes	25	25	10	Recess For Adults is an eight-week program inspired by games typically seen on a playground. This program is perfect for adults to increase their physical activity levels, and to have fun together. A typical class agenda could include, for example, "Red Light, Green Light", "Crazy Kickball", "Blob Tag", and "Group Juggle". This program meets once per week for 45 minutes, for eight weeks. The program will be led by instructor Kerri Schiller, a University of Illinois PhD student in Recreation, Sport, and Tourism.
Intro to Mindful Meditation	2	12:10pm - 12:55pm (T), 5:15pm - 6:15pm (W)	10/17/2017 & 10/18/2017	12/12/2017 & 12/13/2017	Attend 6 out of 8 classes	50	50	24	This beginner-friendly course will introduce the concept of mindful meditation. You will learn how to cultivate tools for mindfulness including breath awareness, visualization, body scan practices, and focus techniques. Each session includes specific mindfulness meditation tips and techniques, a guided meditation session, and time for reflection. By the end of the session, participants will be equipped to integrate mindfulness into their daily lives and maintain their own meditation practice. Participation for all sessions is recommended, but not required. Some benefits of meditation include: -Reduce stress hormones linked to heart disease and immune function -Improve emotional steadiness, gain mental clarity and peace of mind -Build techniques for managing pain, anxiety, and sleeplessness -Enhance brain efficiency and improve concentration and focus -Enhance compassion and improve communication and relationships
Tai Chi	2	5:15pm - 6:15pm (W), 6:30pm - 7:30pm (W)	10/18/2017	12/13/2017	Attend 6 of 8 classes	40	40	17	Introduction to Tai Chi - Core Movements is an eight-week program that aims to improve overall health and wellness through learning basic Tai Chi movements and techniques. All Tai Chi sessions will be taught by Richard Krandel. Richard maintains a certification for Tai Chi from the Tai Chi for Health Institute, and has instructed various programs in the Champaign-Urbana area for the last 7 years. There will be 2 sections of Tai Chi offered this Fall, each with a limited capacity. You may select only one session to attend for the duration of the 8 weeks.
Take Charge of Your Diabetes	1	5:15pm - 7:15pm (Th)	10/19/2017	11/30/2017	Attend 5 out of 6 classes	16	8	5	Diabetes is a chronic and ongoing condition, that many people live with for all of their lives. The good news is that there are ways to manage diabetes, and to prevent or delay serious complications. There is no one way to manage diabetes, and everyone manages slightly differently. In this workshop, you will learn how to use different tools for managing your diabetes, and the instructors will help you to build and carry out a plan that fits your life. This workshop is designed to give you some of the self-management tools needed to take on these tasks, and can help you to be a more active self-manager. This program is a great way to complement any diabetes education that you may be receiving from a medical professional or a registered dietician.
Walktober	1	N/A	10/16/2017	12/3/2017		Unlimited	546	329	Walktober is an online, self-paced wellness activity that encourages participants to take advantage of the beautiful fall weather and walk! The program allows participants to track either their steps or physical activity minutes each day, making progress toward a final goal. As they track their activity, participants will move along a virtual trail, visiting beautiful autumn spots around the world.This program is great for participants of all fitness levels. Whether you are just starting out, or have a well-established physical activity routine, Walktober will help to boost energy and improve health. For user convenience, a mobile application is also available to help with on-the-go activity tracking. Walktober can sync with the following mobile applications, to allow for automatic activity tracking: Fitbit Garmin Connect Movable YOO Apple Health (Note: Apple Health comes standard on most iPhones.)
Weight Watchers	1	N/A	10/16/2017	12/15/2017	Attend at least 6 meetings	Unlimited	20	12	iThrive participants may choose to attend Weight Watchers meetings in the community as their iThrive Wellness Activity for Fall 2017. If you are interested in Weight Watchers, please thoroughly review the information below. Please note that the process and requirements for participating and documenting your attendance in Weight Watchers is different than it was last year.
Total							**771**	**439**	

Table D.6: Description of and statistics for the Spring 2018 wellness activities

Class Name	Number of classes	Time and day of week	Start date	End date	Reward requirement	Capacity	Registered	Completed	Description
Advanced Tai Chi	1	5:15pm - 6:15pm (Th)	2/22/2018	4/19/2018	Attend 6 out of 8 classes	20	11	7	Advanced Tai Chi is a program for participants who have successfully completed an Introduction to Tai Chi class through iThrive. This class will build from the foundation established in the Introductory series, and introduce additional postures.
Full Body Fusion - Group Fitness Class	1	5:15pm - 6:15pm (M)	2/5/2018	4/2/2018	Attend 6 out of 8 classes	25	25	13	Are you looking to improve your overall fitness in a minimum amount of time? Then Full Body Fusion may be for you! Full Body Fusion is an interval training style class that maximizes fun and results. Full Body Fusion will be taught by Kristen Plemons. Kristen is a certified group fitness instructor, and instructs various physical activity programs throughout the Champaign-Urbana community. What is interval training? Interval training is a complete physical activity program. It combines various types of fitness activities in one class. Participants alternate between vigorous activity that increases their heart rate, and muscle strengthening exercises. The result is improvement in a number of fitness areas in less time than in a traditional fitness class. Who is Full Body Fusion for? Full Body Fusion is a strenuous class. It is designed for people who are at least moderately fit, and can exercise at a vigorous level. Participants can work at their own level during the class and make modifications to exercises as necessary, but this may not be the most beneficial option for a beginner. Interval training can carry risks for people with musculoskeletal injuries or heart disease. If you have any of these conditions, please check with your primary care provider before signing up.
Go With Gratitude	1	12:10pm - 12:55pm (W)	2/14/2018	3/28/2018	Attend 5 out of 6 classes	35	29	14	Go with Gratitude is a unique program that will help you discover how to enhance your overall quality of life through cultivating an attitude of gratitude. Research suggests that people who intentionally increase and sustain positive emotions, such as gratitude and optimism, are healthier, happier, and more resilient in coping with life's challenges. During this six week program, participants will explore simple ways to feel more grateful, and express gratitude in their daily life. Each week, participants will engage in small group discussion and participate in a gratitude activity. A gratitude practice to continue during the week will also be provided.
Healthy Weigh	1	5:15pm - 6:15pm (T)	2/6/2018	4/3/2018	Attend 6 out of 8 classes	40	14	5	Are you looking for a safe and effective weight management program? Join the Healthy Weigh! Healthy Weigh is the Campus Wellbeing Service's weight management program. Healthy Weigh equips participants with proper tools to lose weight safely and effectively. This program is not a diet. Participants will: -Learn how to lose and maintain a healthy weight -Attain life management skills to help them attain their weight goals -Receive group support to increase self-confidence
Keep America Active	1	N/A	2/5/2018	4/1/2018	Earn 160 points during the 8- week program	Unlimited	393	262	Keep America Active is an online, self-paced wellness activity that encourages participants to embark on a journey to better health! Participants will take a virtual trip across the United States of America, stopping at the country's most amazing hot spots as they record their healthy behaviors. The program allows participants to track their steps or physical activity minutes, as well as produce servings. Each day, participants will visit a new attraction, earning points and stars as they record healthy behaviors. You can answer fun trivia questions, learn why each attraction should be on your bucket list, and collect badges. This program is great for participants of all health and fitness levels. Whether you are just starting out, or have a well-established physical activity and wellness routine, Keep America Active will help to boost energy and improve health. For user convenience, a mobile application is also available to help with on-the-go activity tracking. Keep America Active can sync with the following mobile applications, to allow for automatic activity tracking: -Fitbit -Garmin Connect -Movable -YOO -Apple Health (Note: Apple Health comes standard on most iPhones.)
Lunchtime Walk	1	12:10pm - 12:55pm (Th)	3/1/2018	4/26/2018	Attend 6 out of 8 sessions	30	16	6	Do you want to get more physical activity, but can't seem to find the time? It just got easier to fit in a walk during your busy day. Sign up for our Lunchtime Walk program. These walks are designed to fit into the average lunch break, allowing enough time to travel to and from the starting point, get a 30-minute walk, and return to your work area. The first three walks (on March 1, March 8, and March 15) will be located in the UI Armory, around the indoor track. After Spring Break, we will meet on the Main Quad in front of the Illini Union, and walk outside.
Intro to Mindful Meditation	2	12:10pm - 12:55pm (T), 5:15pm - 6:15pm (W)	2/20/18 & 2/21/2018	4/10/2018 & 4/11/2018	Attend 5 out of 7 classes	50	43	16	This beginner-friendly course will introduce the concept of mindful meditation. You will learn how to cultivate tools for mindfulness including breath awareness, visualization, body scan practices, and focus techniques. Each session includes specific mindfulness meditation tips and techniques, a guided meditation session, and time for reflection. By the end of the session, participants will be equipped to integrate mindfulness into their daily lives and maintain their own meditation practice. Participation for all sessions is recommended, but not required. Some benefits of meditation include: -Reduce stress hormones linked to heart disease and immune function -Improve emotional steadiness, gain mental clarity and peace of mind -Build techniques for managing pain, anxiety, and sleeplessness -Enhance brain efficiency and improve concentration and focus -Enhance compassion and improve communication and relationships
Recess for Adults	1	5:15pm - 6:00pm (T)	2/7/2018	4/4/2018	Attend 6 of 8 classes	25	19	4	Recess For Adults is an eight-week program inspired by games typically seen on a playground. This program is perfect for adults to increase their physical activity levels, and to have fun together. A typical class agenda could include, for example, "Red Light, Green Light", "Crazy Kickball", "Blob Tag", and "Group Juggle". This program meets once per week for 45 minutes, for eight weeks. The program will be led by instructor Kerri Schiller, a University of Illinois PhD student in Recreation, Sport, and Tourism.
Tai Chi	1	6:30pm - 7:30pm (Th)	2/22/2018	4/19/2018	Attend 6 of 8 classes	20	15	7	Introduction to Tai Chi - Core Movements is an eight-week program that aims to improve overall health and wellness through learning basic Tai Chi movements and techniques. All Tai Chi sessions will be taught by Richard Krandel. Richard maintains a certification for Tai Chi from the Tai Chi for Health Institute, and has instructed various programs in the Champaign-Urbana area for the last 7 years.
Weight Watchers	1	N/A	1/22/2018	4/9/2018	Attend at least 6 meetings	Unlimited	12	5	iThrive participants may choose to attend Weight Watchers meetings in the community as their iThrive Wellness Activity for Spring 2018. If you are interested in Weight Watchers, please thoroughly review the information below. Please note that the process and requirements for participating and documenting your attendance in Weight Watchers is different than it was last year.
Wellness Potpourri	1	N/A	2/5/2018	4/25/2018	Attend at least 6 activities	Unlimited	29	3	Wellness Potpourri gives iThrive participants the chance to sample unique wellness opportunities all across the UIUC campus during the Spring 2018 semester. Participants will choose various activies from the list below to attend throughout the Spring semester. Participants will be provided with their own "attendance sheet" upon registration. If you attend an in-person activity: Bring your attendance sheet to the approved event, and obtain a signature from an event facilitator. If you attend an online webinar: Write down the name and date of the webinar program on your attendance sheet, and the iThrive staff will verify your attendance with the webinar facilitators. At the end of the semester, the participant will email a copy of the attendance sheet to iThrive Project Manager Lauren Geary. Note: If there is a cost associated with a Wellness Potpourri event, iThrive participants are responsible for that cost.
Total							**606**	**342**	

Table D.7: Dates, locations, times, and number of health screenings performed in 2018

Date	Location	Appt Times	Capacity	Appts scheduled	Total Screened
Monday, August 20	iHotel	6:00am - 11:20am	128	124	120
Tuesday, August 21	Beckman Institute	6:00am - 11:20am	128	117	108
Wednesday, August 22	Wohlers Hall	6:00am - 11:20am	128	70	65
Thursday, August 23	Wohlers Hall	6:00am - 11:20am	128	61	56
Friday, August 24	iHotel	6:00am - 11:20am	128	121	107
Saturday, August 25	OSF Heart of Mary Medical Center	7:00am - 11:00am	96	53	49
Monday, August 27	iHotel	6:00am - 11:20am	128	115	105
Tuesday, August 28	ACES Library	7:30am - 11:20am	92	89	84
Wednesday, August 29	Beckman Institute	6:00am - 11:20am	128	109	101
Thursday, August 30	University YMCA	6:00am - 11:20am	128	105	99
Friday, August 31	Physical Plant Services Building	7:45am - 11:20am	84	41	38
Saturday, September 1	N/A	N/A			
Monday, September 3	N/A	N/A			
Tuesday, September 4	iHotel	6:00am - 11:20am	128	97	82
Wednesday, September 5	Levis Faculty Center	6:00am - 11:20am	128	83	80
Thursday, September 6	University YMCA	6:00am - 11:20am	128	69	61
Friday, September 7	iHotel	6:00am - 11:20am	128	94	81
Saturday, September 8	OSF Heart of Mary Medical Center	7:00am - 11:00am	96	16	12
Monday, September 10	Beckman Institute	6:00am - 11:20am	128	50	45
Tuesday, September 11	Levis Faculty Center	6:00am - 11:20am	128	82	70
Wednesday, September 12	Beckman Institute	6:00am - 11:20am	128	51	43
Thursday, September 13	University YMCA	6:00am - 11:20am	128	78	68
Friday, September 14	iHotel	6:00am - 11:20am	128	100	84
Saturday, September 15	N/A	N/A			
Monday, September 17	iHotel	6:00am - 11:20am	128	32	24
Tuesday, September 18	Beckman Institute	6:00am - 11:20am	128	23	18
Wednesday, September 19	Beckman Institute	6:00am - 11:20am	128	42	36
Thursday, September 20	iHotel	6:00am - 11:20am	128	66	53
Friday, September 21	iHotel	6:00am - 11:20am	128	86	72
Total			**3,184**	**1,974**	**1,761**