Workplace Wellness Executive Summary

The Illinois Workplace Wellness study sought to evaluate the effectiveness of workplace wellness initiatives on employee healthcare spending. Simply evaluating effectiveness by comparing firms with workplace wellness programs against firms that do not will not determine the causal effects, as that would require the firms to be equivalent in all other respects. By using a singular firm but randomizing eligibility, we are able to more accurately assess the causal effect of workplace wellness initiatives on two separate but otherwise equal groups of individuals.

Composed of 4,834 employees in total, volunteers were divided into two groups, a control group of 1,534 individuals that were not eligible for workplace wellness benefits, and a treatment group of 3,300 individuals that were. By collecting information on healthcare spending before the program began for both groups, we were able to demonstrate these two groups were successfully randomized, which is shown by the p-values all being larger than 0.05.

```
print(before_2016_outcomes)
              variable control_mean treatment_mean   p_value
         covg_0715_0716    0.6348912      0.6316084 0.8218921
nonzero_spend_0715_0716    0.8985507      0.8852834 0.2620264
    spendHosp_0715_0716  283.3603872    259.3314396 0.3867870
     spendOff_0715_0716   66.7116670     57.9754011 0.3770672
      spendRx_0715_0716  103.3652594    101.2699100 0.9088545
        spend_0715_0716  505.5786089    464.8135828 0.3063791
```

Afterwards, those in the treatment group were given the opportunity to participate in the workplace wellness program. Of the 3,300 individuals in the treatment group, 1,900 elected to participate. One year later, data is sampled again as shown below.

```
print(post_treatment_outcomes)
                        variable diff_se_no_demographic
                    covg_0816_0717         0.0043 (0.0146)
                diabetes_0816_0717        -1.1608 (0.8820)
          hyperlipidemia_0816_0717        -0.5973 (1.4563)
            hypertension_0816_0717        -2.6879 (1.3658)
           nonzero_spend_0816_0717        -0.0079 (0.0112)
          pcp_any_office_0816_0717         0.0195 (1.1974)
          pcp_any_visits_0816_0717        -0.8520 (1.8141)
        pcp_total_office_0816_0717        -0.0545 (0.0758)
        pcp_total_visits_0816_0717        -0.0650 (0.0841)
0        pos_er_critical_0816_0717        -0.0200 (0.0181)
1           pos_hospital_0816_0717         0.0003 (0.0244)
2  pos_office_outpatient_0816_0717        -0.0825 (0.1248)
3              spendHosp_0816_0717      -10.2985 (40.2588)
4               spendOff_0816_0717        -7.8444 (8.8318)
5                spendRx_0816_0717      -10.4189 (24.6295)
6                  spend_0816_0717      -31.1820 (54.2564)
  diff_se_with_demographic
           0.0051 (0.0145)
          -1.0091 (0.8683)
          -0.0886 (1.3802)
          -2.2706 (1.3002)
          -0.0060 (0.0109)
           0.0393 (1.1888)
          -0.7576 (1.8032)
          -0.0519 (0.0755)
          -0.0591 (0.0835)
0         -0.0197 (0.0181)
1          0.0015 (0.0244)
2         -0.0493 (0.1188)
3        -5.7309 (39.9646)
4         -7.6095 (8.8031)
5        -9.0893 (24.6255)
6       -24.2860 (53.7676)
```

When comparing the treatment to the control group, there is not much causal treatment effect in most cases, since most of the estimates are within 2 standard errors of zero. Thus, it's likely that merely being selected into the treatment group is not enough to make a difference in health in a time span of one year, meaning that the workplace wellness program did not help improve health outcomes much in this case. This is true for the regressions with and without demographic controls. This makes sense, as we should not expect the outcomes to differ much based on demographic, as people were randomly assigned to treatment and control groups, so there should be no major differences between the treatment and control group due to demographic.

```
> print(post_treatment_outcomes_p)
                         variable diff_se_no_demographic
1                  covg_0816_0717        0.1387 (0.0164)
2               diabetes_0816_0717       -1.4638 (0.9873)
3         hyperlipidemia_0816_0717        0.3453 (1.6749)
4           hypertension_0816_0717       -3.8575 (1.5396)
5          nonzero_spend_0816_0717        0.0610 (0.0131)
6         pcp_any_office_0816_0717        0.7397 (1.3830)
7         pcp_any_visits_0816_0717        1.7540 (2.0912)
8       pcp_total_office_0816_0717        0.0037 (0.0847)
9       pcp_total_visits_0816_0717       -0.0010 (0.0959)
10       pos_er_critical_0816_0717       -0.0183 (0.0199)
11          pos_hospital_0816_0717       -0.0689 (0.0287)
12 pos_office_outpatient_0816_0717        0.2058 (0.1419)
13             spendHosp_0816_0717    -103.0530 (45.8727)
14              spendOff_0816_0717      14.9635 (7.3744)
15               spendRx_0816_0717     -26.6255 (26.8354)
16                 spend_0816_0717    -117.1627 (59.1350)
   diff_se_with_demographic
1           0.1408 (0.0163)
2          -1.0563 (0.9745)
3           1.2916 (1.5927)
4          -3.2578 (1.4754)
5           0.0518 (0.0128)
6          -0.0804 (1.3771)
7           0.8714 (2.0860)
8          -0.0306 (0.0847)
9          -0.0423 (0.0956)
10         -0.0208 (0.0200)
11         -0.0679 (0.0288)
12          0.1239 (0.1346)
13      -113.9735 (45.6424)
14        11.4718 (7.3400)
15       -26.3056 (26.9427)
16      -135.3230 (58.5567)
```

However, there is a statistically significant difference within the treatment group between participants and non-participants, specifically in coverage, hypertension, non-zero spending, hospital visits, hospital spending, and overall spending. However, these differences cannot be attributed to the causal effect of the workplace wellness program due to selection bias. Since participating or not participating is a choice made by these individuals, it is likely correlated with other choices related to one's health, meaning that there are significant differences between the two groups that are not due to the causal effect of the treatment. This estimate was different when comparing with and without demographic controls. This is to be expected, since unlike in the previous analysis, demographic is not controlled for by random assignment, so a good amount of the differences between participants and non-participants can be attributed to differences in demographic.

Overall, our analysis found little causal effect of workplace wellness programs on the health of employees. Many of the differences can only be attributed to correlations caused by omitted variable bias, and not the causal effect of the programs themselves. Thus, when

considering the creation of such programs in a certain workplace, employers should carefully consider the methodology of research studies to ensure whether workplace wellness programs truly have a causal impact for that specific industry.