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Post-Offer Employment Testing and Its Impact on Health Care Costs for Employers

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Objective: To quantify the cost benefits associated with Post-Offer Employment Testing (POET). **Methods:** Cross-sectional analysis of 5 million individuals/480 million medical, prescription, absence, short- and long-term disability, property and casualty and workers' compensation claims. Individuals who received POET were statistically matched by company, position, age, and gender to candidates who did not. **Results:** Significant injury reduction rates and integrated benefits cost savings were found in the cohort screened by POET. **Conclusion:** POET is an effective tool for the employer to manage health, disability, motor vehicle crash, at-work injury costs, and reduce turnover.

Keywords: Post-Offer Employment Testing, POET, benefits, health insurance, workers compensation, absence, disability, injury reduction, motor vehicle crash, turnover

LEARNING OUTCOMES

- Assess the effectiveness of Post-Offer Employment Tests (POET) workplace injuries in reduction of workplace injuries.
- Determine if POET has other employer cost impacts including reduction in health related expenditures such group health, absences, pharmaceutical plan costs, motor vehicle crashes and employee turnover.

American employers are responsible for a wide range of employee health and wellness costs, the foremost of those being health care, short- and long-term disability, and workers' compensation. Containing these costs has become one of the primary objectives of finance and Human Resources departments.

Between 2008 and 2018, the average family premium in employer-sponsored health care increased 55% to almost $20,000 a year,[1] of which employers pay 82% on average.[2] Although workers' compensation costs have decreased as a percentage of total wages, employer costs increased in total.[3] According to research from the National Council on Compensation Insurance, the average cost for all workers' compensation claims in 2016 to 2017 was $40,051, with the most expensive claims coming from potentially avoidable injuries—vehicle incidents, burns, and slips/falls.[4]

Although many companies have insurance to help cover the direct costs of workers' compensation and disability, there are indirect costs that are not covered, including wages paid for absences not covered by workers' compensation, wage costs related to time lost through work stoppage, administrative time spent by supervisors after injuries, employee training and replacement costs, lost productivity related to new employee learning curves and accommodation of injured employees, and replacement costs of damaged property.[5]

The purpose of this study was to confirm whether POET enables employers to help contain costs by determining if individuals were fit to perform their job duties without risk to themselves or others.

METHODS AND DATA

Workpartners was engaged to conduct a cross-sectional analysis to observe the differences in medical and drug claims, short-term disability, workers' compensation claims, preventable motor vehicle accidents, and employee turnover between the POET group and the control group without POET assessment.

The study group included employees from four different employers. Assessments included but were not limited to lifting capacity, lifting mechanics, pushing and pulling capacity, grip strength, and sleep apnea. Current employees who completed the assessment later in their employment history were excluded from the analysis. POET results were provided by WorkSTEPS.

All employee claims data was from the RRDb. The RRDb contains demographic, employment, compensation, medical claims, pharmacy claims, disability, workers' compensation, and absence data sources from over 4 million insured health plan members in all 50 U.S. states over a 20+ year period. The information is collected from insurance companies and self-insured employers.

Apart from the turnover analysis, all employees included in both test and control samples had at least 1 year of employment.

Specific qualifications for inclusion in the study included the following:

- For medical and drug claims, the population was limited to only those who were enrolled in medical coverage.
- For short-term disability, the population was limited to employees enrolled in short-term disability coverage.
- Workers' compensation claims do not require medical or short-term disability coverage, so all employees remained.

Statistical Analysis

Data analysis was completed using SAS Enterprise (version 7.15). There were three primary analytic goals:

1. Evaluate differences in first-year post-employment claims costs (medical, drug, workers' compensation, and short-term disability) for POET and non-POET populations.
2. Evaluate differences in 4-year preventable motor vehicle incident (PMVI) rates for POET and non-POET populations.
3. Evaluate differences in employee turnover rates for POET and non-POET populations.

The comparison population was built through greedy nearest neighbor matching,[6] matching the population with POET screening to a comparison control group without POET screening. Starting with the POET population, employees without POET screening were matched, without replacement, based on age, gender, position, start date, and company, with two controls per case for larger clients and one control

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B.H. is employed by WorkSTEPS, and J.S. has no conflicts of interest to declare.

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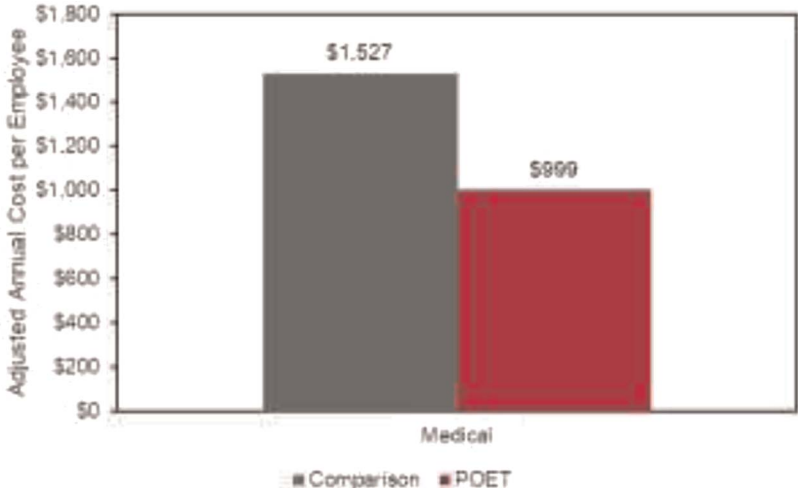

FIGURE 1. Difference in annual cost among applicants who passed POET and comparison group.

for smaller clients. In matching without replacement, once a control match was found, that employee is no longer eligible to be reused in the control group. The greedy algorithm finds the best matches first, so that one match at a time is optimized, instead of the whole system. Of the 138 job classifications, nine did not have enough employees to create a comparison group, so only the most common job classifications were included in the analysis for a total N of 1505.

A two-part generalized linear model (GLM) was used to estimate the differences in medical, drug, workers' compensation, short-term disability, and PMVI costs (Analytic Question 1). Control variables were constructed to adjust for differences in the groups, including gender, company, salary, and location.

Two-part regression modeling often is used in circumstances where the dependent variables (medical, drug, workers' compensation, short-term disability, and PMVI costs) are right skewed with a large proportion of valid zeroes. This is very common in health plan data modeling.[7,8] The first of the two-part GLM models used logistic regression to predict the probability that cost was greater than zero. The second part used a GLM with a log link and gamma distribution to conditionally predict cost for those with cost greater than zero.

The RRDb does not contain damage costs related to vehicle repair, vehicle loss, insurance premium impact, or legal/liability fees. To find the average PMVI cost per employee (Analytic Question 2), a logistic regression model was used to predict the probability that there was an accident for both the study and comparison groups. The probability was multiplied by the cost when there were no injuries, as well as the rate and cost when there was an injury found in previously published journals.[9,10]

To assess the difference in termination rates for each group as described in Analytic Question 3, a Kaplan-Meier survival curve approach was used because of its ability to adjust for censored observations. The Kaplan-Meier survival curve increases confidence in the model in earlier months of the observed period. This allowed the utilization of observations that have not yet reached the end of the analysis period enabling the use of partially complete data, which increased sample size. Using available termination dates, the time in months to employee termination was created for both the study group and the comparison group. The duration was limited to 4 years, and the nonparametric log-rank test was used to assess the statistical difference between the two survival curves.

RESULTS

Analytic Question 1

Figures 1–5 present medical, drug, short-term disability, and workers' compensation costs, which were significantly lower for the POET group at the $P < 0.05$ level in the first year of employment. Medical claims saw the largest cost savings ($528) followed by short-term

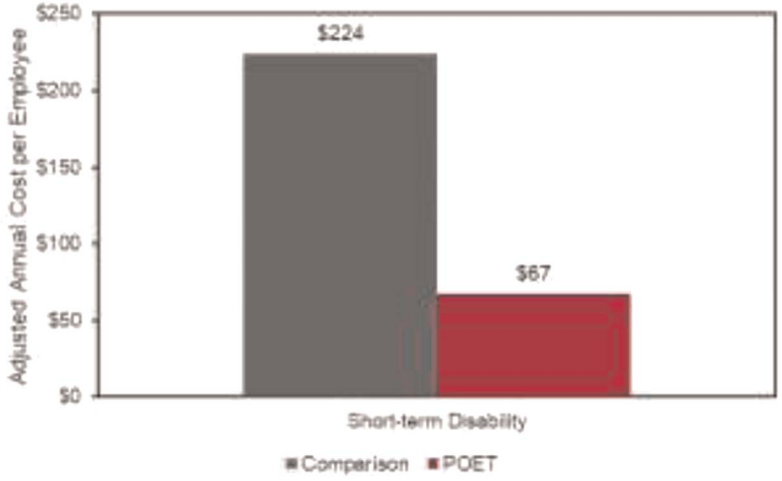

FIGURE 2. Annual short-term disability cost difference between applicants that passed POET and comparison group.

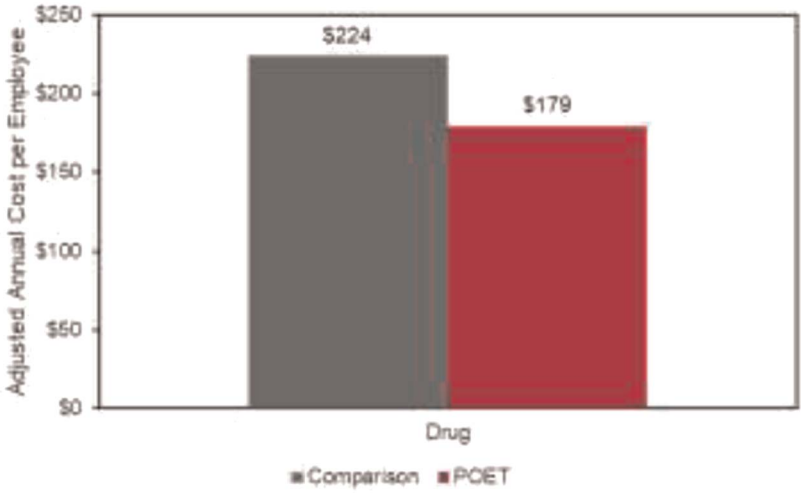

FIGURE 3. Annual pharmaceutical cost difference for applicants who went through POET and comparison group.

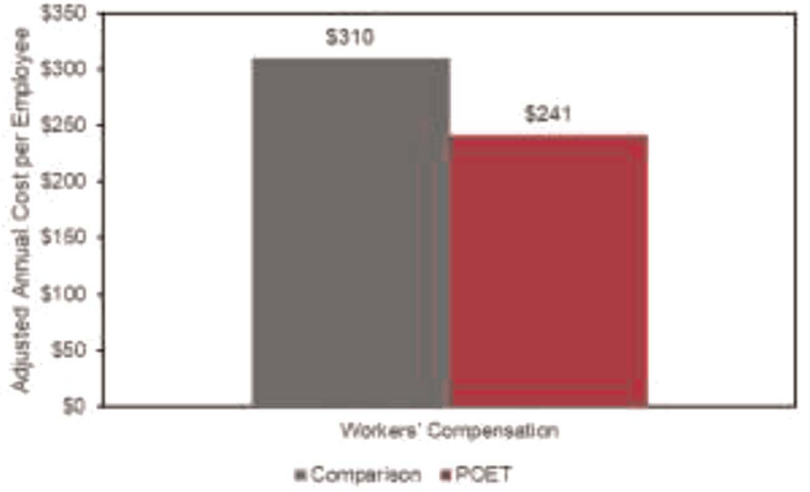

FIGURE 4. Annual spend for workers compensation for employees who passed POET and comparison group.

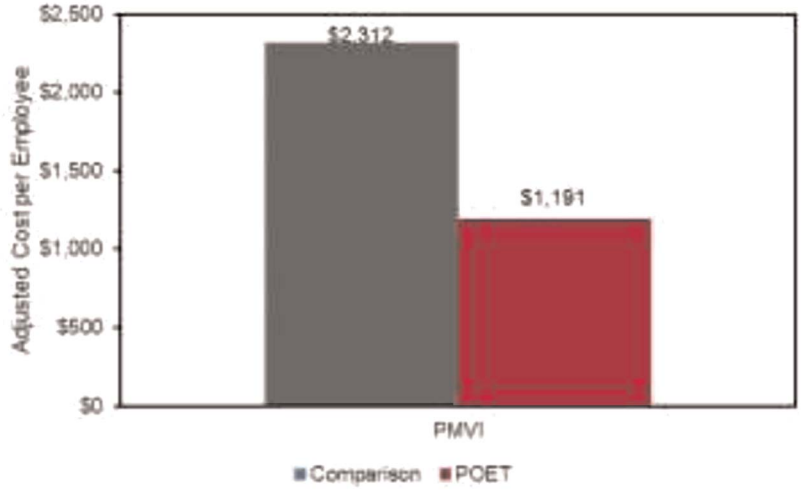

FIGURE 5. Difference in first year spend for workers compensation among applicants who passed POET and comparison group.

TABLE 1. Comparison of First Year Costs for Integrated Benefits Costs Among Applicants Who Went Through POET and the Comparison Group

Cost category	Study group	Comparison group	Savings	*P*
Medical	$999 (n = 1006)	$1527 (n = 1509)	$528	<0.001
Drug	$179	$224	$44	<0.001
Workers' compensation	$241 (n = 1825)	$310 (n = 2555)	$68	0.040
Short-term disability	$67 (n = 881)	$224 (n = 1304)	$157	<0.001
Preventable motor vehicle incidence	$1191 (n = 452)	$2312 (n = 438)	$1121	0.001
Turnover	70.0% (n = 2745)	62.8% (n = 5343)	7.2%	<0.001

disability ($157), workers' compensation ($68), and drug ($44) for a combined yearly savings of $797. If savings were scaled for the hiring of 1000 workers, an employer using POET could expect savings of nearly $800,000.

Analytic Question 2

Four years of data were required to generate a statistically significant result because of the low incidence of drivers and accidents in the population. Once the sample size was large enough, savings of $1121 were found between the POET and comparison groups as presented in Table 1.

Analytic Question 3

The POET employees had a significantly lower turnover rate over the 4-year period (70% vs 62.8%, $P < 0.001$, Table 1). The mean employment time for non-POET employees was 32.4 months, whereas the mean employment time for POET employees was 35.5 months. There was a slightly higher percent of POET employees censured (33.9% vs 30.9%).

Limitations

Although significant effort was made to control for confounding factors in the differences between groups, some of the effects may have been driven by variables not available in the study.

PMVI analyses were based on the results from only a single company. Although results were statistically and practically significant, further analysis will be completed when data become available.

The models were controlled for employee position and geographic location; however, data were not available on the differences in daily duties and areas traveled within the same job title.

CONCLUSIONS

POET provides cost savings in the form of medical, drug, workers' compensation, short-term disability, and preventable motor vehicle incidence reduction and reduced employee turnover.

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