



## *OPIOIDS, PAIN AND ABSENCE*

### THE PRODUCTIVITY IMPLICATIONS OF SUBSTANCE USE AMONG U.S. WORKERS

Erin L. Peterson, MPH  
Researcher

Brian Gifford, PhD  
Director, Research and Analytics

April 2019

#### EXECUTIVE SUMMARY

The opioid epidemic has resulted in many analyses of the social and economic costs related to the problematic use of heroin and opioid pain relievers. The implications for employers as stakeholders often center on the risk of on-the-job accidents or difficulties in filling job vacancies in areas heavily affected by addiction and dependence. This may not only underrepresent the more pervasive productivity impact of lost work time, but also obscures the larger issues of chronic pain and substance use more generally. This study examines the use and abuse of prescription pain relievers and other substances and their association with absences from work.

- One in three workers reported using pain relievers—the majority of whom used medication as prescribed. Less than one in 20 workers reported abuse of pain relievers or dependence. Less than 1% reported any heroin use.
- Rates of alcohol abuse and dependence exceed the problematic use of pain relievers and other prescription medications. Any reported use of cocaine or methamphetamine was relatively uncommon (< 3% and < 1%, respectively).
- Excess absences associated with pain relievers were greater than excess absences associated with any other substance. On average, non-problematic use of pain relievers was associated with 0.8 days of excess absences per month compared with non-users. The problematic use of pain relievers was associated with 2.0 absences, or 1.2 excess days per month compared with non-users.
- Generally, excess absences associated with problematic use of substances are significantly greater than for non-problematic use.
- Assuming a 20-day work month, the use of pain relievers was associated with a loss of about 1.3% of the monthly labor capacity of 1,000 workers. The non-problematic use of pain relievers accounts for nearly all (96%) of those losses.

Chronic pain in the workforce contributes to the opioid epidemic and lost work time. Effective pain management approaches that minimize the risk of opioid abuse may improve productivity as they help curb the epidemic. Expert guidance is provided to help employers understand their risk of substance abuse issues, raise awareness in their workforces, prevent episodes of pain management from becoming addiction, ensure access to substance abuse resources and leverage the expertise of partner organizations.

## Background

The opioid epidemic has garnered public and policy attention for its scale, lethality and impact on the lives of users and their loved ones.<sup>1-3</sup> While there has been some consideration paid to the workforce implications of the epidemic,<sup>4-6</sup> the focus is often on the risk of on-the-job incidents<sup>7</sup> or difficulties in filling job vacancies in areas heavily affected by addiction and dependence.<sup>8,9</sup> Less attention has been paid to the routine productivity impact in the employed workforce.<sup>5,10</sup> This can result in an underestimation of the economic burden borne by employers and can complicate efforts to engage them as stakeholders in addressing the epidemic. Viewing the epidemic in isolation from the underlying prevalence of chronic pain and abuse of other substances also obscures its larger social context.

This study examines lost work time associated with prescription pain relievers within the context of other substance use disorders in the U.S. labor force. It poses two questions:

1. How many workers use medical, legal and illicit substances in problematic (e.g., abuse and dependence) and non-problematic (e.g., using medications as prescribed and drinking without behavioral implications) ways?
2. Do substance users have more absences from work than non-users and is problematic use associated with more lost work time than non-problematic use?

## Data

The National Survey on Drug Use and Health is a cross-sectional survey of U.S. households that provides national estimates for the use of drugs, alcohol and tobacco among the civilian population of at least 12 years of age. We use data from the years 2015, 2016 and 2017, which include information about the appropriate use (i.e., prescribed) of pain relievers as well as the problematic use (i.e., abuse and dependence). We include in our analysis those in the labor force over the age of 18 (n = 84,579).

Our analysis focuses on the use of the legal, medical and illicit substances listed in [Figure 1](#).

**Figure 1: Substances included in the analysis**

| Category       | Substance  |
|----------------|--|
| <b>Medical</b> | <ul style="list-style-type: none"><li>• Pain relievers (prescription; excludes over-the-counter NSAIDs)</li><li>• Tranquilizers</li><li>• Stimulants</li><li>• Sedatives</li></ul> |
| <b>Legal</b>   | <ul style="list-style-type: none"><li>• Alcohol</li><li>• Tobacco</li></ul>  |
| <b>Illicit</b> | <ul style="list-style-type: none"><li>• Marijuana<sup>1</sup></li><li>• Cocaine</li><li>• Methamphetamine</li><li>• Heroin</li></ul>   |

<sup>1</sup>Although some states have legalized marijuana (AK, CA, CO, MA, ME, MI, NV, OR, VT and WA) and more have legalized the medical use of marijuana (AK, AZ, CT, DE, FL, HI, IL, LA, MD, MN, MO, MT, ND, NH, NJ, NM, NY, OH, OK, PA, RI, UT and WV), this dataset does not allow us to control for the legal status of this substance by state. In addition, marijuana remains a designated illicit substance by the federal government.

We categorize patterns of use as illustrated in [Figure 2](#). The three main categories are non-use, non-problematic use and problematic use. The term *non-problematic* is not used to indicate the absence of harm or to imply that use conforms to broad social norms. Non-problematic use includes the appropriate use of prescribed medications and the use of legal and illicit substances without behavioral implications. Problematic use includes patterns of use with behavioral implications such as abuse of and dependence on medical, legal and illicit substances. For more information about the categories for self-reported types of substance use, please see the appendix.

**Figure 2:** Patterns of use of medical, legal and illicit substances

|         |                                 |                  |   |                    |                              |            |
|---------|---------------------------------|------------------|---|--------------------|------------------------------|------------|
| Non-use | Use                             |                  |   |                    |                              |            |
|         | Non-problematic                 |                  |   |                    | Problematic                  |            |
|         | Without behavioral implications |                  |   |                    | With behavioral implications |            |
|         | Prescribed medical substances   | Legal substances | Medical substances without prescription | Illicit substances | Abuse                        | Dependence |

Our principal outcome is illness-related work absence, assessed by the question *During the past 30 days, how many whole days of work did you miss because you were sick or injured?*

## Analysis

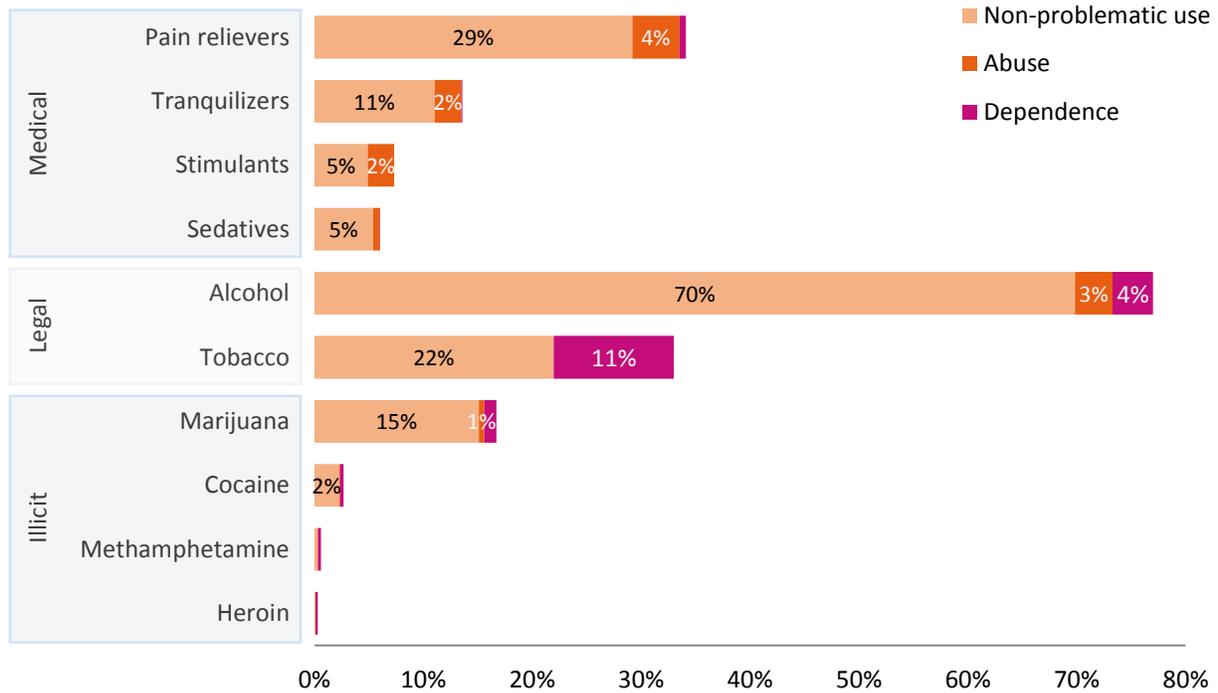
We report patterns of substance use descriptively. Missed workdays are estimated using multiple linear regression. Models are estimated for each substance separately and include as covariates sex, age, employment status, educational attainment, insured status, poverty status and self-reported health. Reported estimates are weighted to account for the complex survey design. Detailed descriptions of the regression model and variables are included in the appendix.

## Results

### PREVALENCE OF SUBSTANCE USE

[Figure 3](#) shows the patterns of medical, legal and illicit substance use. One in three workers reported using pain relievers, the majority of which was non-problematic prescription use. Less than one in 20 workers reported abuse of pain relievers or dependence. Heroin use—which sometimes follows the use of pain medications<sup>11</sup>—was much less common (< 1%).

**Figure 3: One in three workers reported using pain relievers —nearly all by prescription**

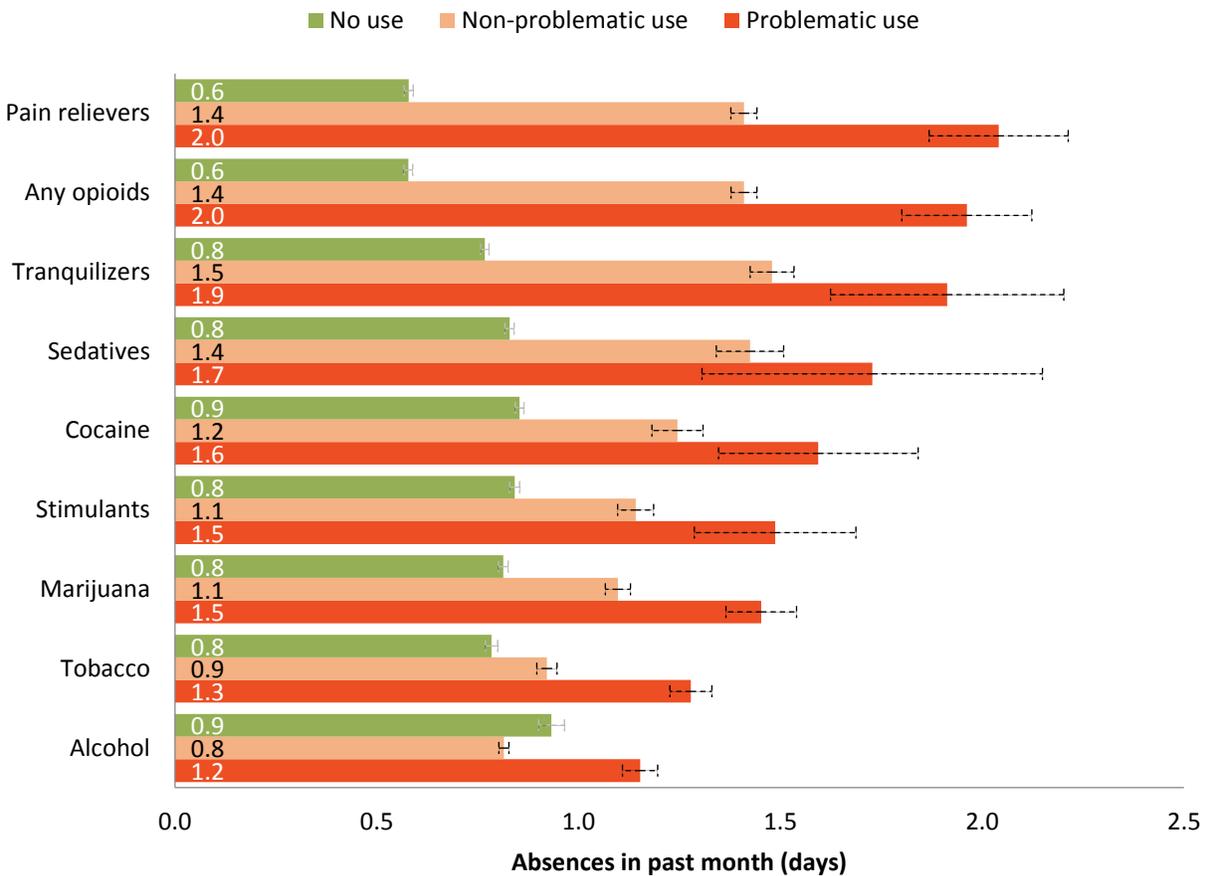


By contrast, more than three in four workers used alcohol and one in 14 indicated patterns of alcohol abuse or dependence. Marijuana was the most commonly used illicit substance (one in six workers) and exceeded the use of tranquilizers, stimulants and sedatives, respectively. Prescription abuse and dependence was highest for tranquilizers and stimulants (< 3% of the total in each case). Reported use of cocaine and methamphetamine was relatively uncommon (< 3% and < 1%, respectively).

#### LOST WORK TIME AMONG SUBSTANCE USERS

Figure 4 shows the differences in lost workdays for users of substances compared with non-users. On average, non-problematic users of pain relievers (i.e., users of prescribed medications) missed 1.4 days of work per month compared with 0.6 days for non-users ( $p < 0.05$ ). Thus, the prescribed use of pain relievers was associated with 0.8 days of excess absences per month. The problematic use of pain relievers was associated with 2.0 absences ( $p < 0.05$ ), or 1.2 excess days compared with non-users, after controlling for other factors.

**Figure 4: Users of pain relievers have more absences from work than non-users regardless of whether use is problematic**



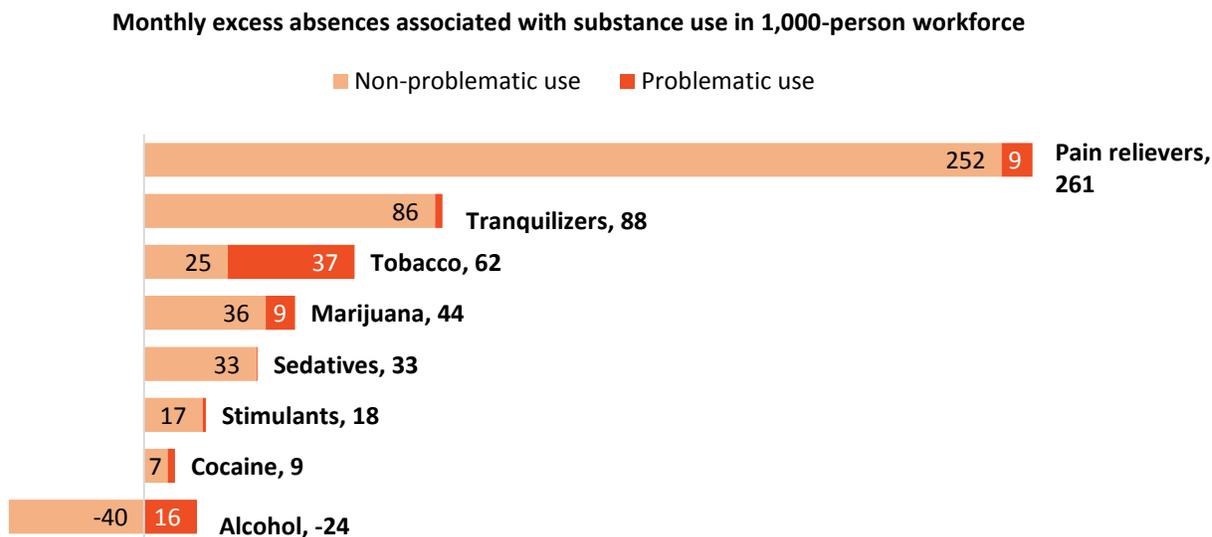
Notes: Brackets indicate the 95% confidence interval around the estimate. Brackets that do not overlap have a high probability that estimates are distinct. All reported findings are statistically significant at or below the 0.05 level compared with non-users. Heroin and methamphetamine not are shown due to the small number of users.

The pattern of increased absence among non-problematic and problematic users was observed for all substances with the exception of alcohol (for which non-problematic use was associated with fewer lost workdays on average). Excess absences associated with pain relievers were greater than excess absences associated with any other substances. Excess absences for problematic use are significantly greater than for nonproblematic use for all substances with the exception of sedatives (for which any use is associated with about 0.6 excess absences).

**POPULATION ESTIMATES OF SUBSTANCE-RELATED LOST WORK TIME**

The broader impact of substance use is estimated as the product of the excess absences for each substance and the proportion of the workforce in each category of use. Applied to a hypothetical 1,000-person workforce, [Figure 5](#) shows that pain reliever use accounts for the largest amount of lost productivity—261 days per month for every 1,000 employed persons. Assuming a 20-day work month, the use of pain relievers is associated with a loss of about 1.3% of the monthly labor capacity of 1,000 workers. The non-problematic use of pain relievers accounts for nearly all (96%) of these losses. Tranquilizer use shows a similar pattern; of the 88 days of tranquilizer-related absences per month, nearly all are associated with non-problematic use.

**Figure 5: The non-problematic use of pain relievers is associated with more absences per month than the use of any other substance**



Notes: Results estimated as product of substance use prevalence and excess days. Findings reflect model results reported in Figure 4 and should not be summed to produce a grand total.

In comparison, problematic pain reliever use accounts for only nine days of absence per month, less than the amount associated with the problematic use of tobacco (37 days) or alcohol (16 days), and similar to losses associated with the problematic use of marijuana (9 days) and all use of cocaine (9 days). As the only substance for which non-problematic use is associated with fewer absences than non-use, alcohol shows net-negative absences per month.

## Discussion

The use of pain relievers is associated with excess lost work time both relative to non-use and within the larger population. Our results are corroborated by others for excess lost workdays, for example when comparing days of absence following or not following American College of Occupational and Environmental Medicine opioid guidelines.<sup>10</sup> The relatively large volume of absences associated with non-problematic use underscores the fact that the opioid epidemic reflects a larger epidemic of chronic pain, which by itself has an impact on workers’ ability to attend work regularly. Thus, effective pain management approaches that minimize the risk of opioid abuse may improve productivity as well as help curb the epidemic.

It is important to note that our research uses lost workdays as a proxy for productivity. It is likely that quality of work on the job also suffers due to substance use and abuse. As a result, our analysis offers a conservative estimate of the effect of substance use on job performance. Future research is needed to offer a more complete picture of the impacts of non-problematic and problematic use of substances on the workforce population.

Abuse of and dependence on opioids—though certainly a public health concern—present a smaller productivity burden for employers, at least when it comes to incidental sick-day absences, as shown in our findings. Moreover, other substances for which there are no (or uncertain) therapeutic uses have a productivity impact comparable to the problematic use of pain relievers. This supports the value of comprehensive workplace substance abuse strategies in concert with larger public health initiatives.<sup>12-14</sup>

## Guidance for Employers

To help employers develop effective substance abuse management strategies for their workforces, IBI sought input from experts at leading healthcare, benefits and absence management firms. A summary of their guidance follows.

### Acknowledgments

#### IBI THANKS THE FOLLOWING INDIVIDUALS AND FIRMS FOR PROVIDING INPUT FOR EMPLOYER GUIDANCE.

Beth Chiappetta, Product Strategy  
Principal, Cigna

Fraser W. Gaspar, PhD, Epidemiologist,  
ReedGroup

Dan Jolivet, PhD, Workplace Possibilities  
Practice Consultant, Standard Insurance  
Company (The Standard)

Anjlee Joshi, Optum Behavioral Health

Robin Kahn, Associate Director, Employer  
Marketing, U.S. Market Access, AbbVie

Jenny Merrithew, VP, Cigna Group  
solutions

Donald Potter, Vice President, Client  
Relations, UnitedHealthCare

Michael Rowe, DO, Senior Medical  
Director, WorkPartners

Kristin Tugman, PhD, CRC, LPC, VP, Health  
& Productivity Analytics and Consulting  
Practice, Group Insurance, Prudential  
Group Insurance

Sheila Weiss, RN, Assistant Vice President  
of Clinical Services, of Sun Life Financial  
and their EAP partner, ComPsych  
GuidanceResources

Jennie Wheeler, Senior Director,  
Integrated Analytics, WorkPartners

### UNDERSTAND YOUR RISKS

Employers with a clear sense of how many of their employees are at risk of developing a substance abuse problem will be better positioned to prioritize resources for prevention and treatment.

- Use confidential health risk assessments to identify employee issues and medications with potential for abuse. Ensure that covered topics include such health risks as alcohol, tobacco and illicit drug use but also the prevalence of painful conditions for which opioids may be prescribed. Given the sensitive nature of this information, it may be necessary to partner with third-party organizations.
- Work with your group health carrier or pharmacy benefits manager to track overall spending and trends for opioids and other prescriptions with the potential for abuse. This can help to identify possible drug-seeking behaviors (e.g., early refills, multiple prescribers and multiple pharmacies), high opioid prescribers, and ensure that opioid prescriptions follow evidence-based guidelines.

### RAISE AWARENESS IN YOUR WORKFORCE

Employees and supervisors are unambiguous stakeholders in your efforts to prevent workforce substance abuse problems.

- Provide workplace training and education for managers, including awareness of your company's risk and their roles and responsibilities in identifying potentially problematic behavior. Sensitivity training can help destigmatize substance abuse (and other behavioral health conditions), making it more likely that employees will seek needed help.
- Educate employees about the resources available to them as a benefit of their employment. This could include time-off policies (including Family and Medical Leave and intermittent leave options) as well as services such as employee assistance programs, outpatient and inpatient detoxification programs, inpatient and residential rehabilitation, partial hospitalization and intensive outpatient programs, medication-assisted treatment, and opioid alternatives (e.g., chiropractic, acupuncture and physical therapy).
- Publish a formal drug-free workplace policy statement with specific references to opioids (as opposed to simply "illegal substances") and other substances prone to abuse. Clearly outline the consequences of violating workplace policies.

## PREVENT PAIN MANAGEMENT FROM BECOMING ABUSE

The findings of this report serve as a reminder that the opioid epidemic occurs within a larger context of widespread pain.

- Identify and respond immediately to workplace injuries, focusing on rapid access to treatment and early referrals to pain management specialists representing diverse specialties and approaches (e.g., psychological interventions, acupuncture and mindfulness meditation).
- Identify injured employees with risk factors for developing chronic pain, such as co-morbid health conditions, “poor” self-rated health, a history of low back or widespread pain, or prior contact with the workers’ compensation system. Older workers and those with low levels of physical activity are at particular risk. Pay attention to cognitive and emotional factors, such as psychological distress, anxiety or depression, or an expectation that pain will become persistent.
- Coordinate a post-injury plan with the employee, their treating providers, case managers, pharmacy benefits managers and your company’s human resources or benefits professionals.
- Use return-to work strategies that include graduated returns, flexible schedules to support treatment adherence, temporary job reassignment and work accommodations such as ergonomic design, regular stretch breaks and postural change.
- Work with your pharmacy benefits manager to ensure pain medications comply with opioid prescribing guidelines and use guidelines to educate physicians who have been identified as high prescribers.

## ENSURE THAT EMPLOYEES GET NEEDED TREATMENT FOR SUBSTANCE USE DISORDERS

Even with the best awareness and prevention efforts in place, some employees will develop problems with opioids or other substances. Approaching substance use disorder as a chronic condition and ensuring patients’ access to evidence-based treatment resources can help restore their quality of life and allow them to resume their role in the workplace.

- Evidence-based treatments include cognitive behavioral therapy, motivational interviewing, brief interventions, relapse prevention, community reinforcement approaches, contingency management and pharmacological treatments.<sup>15</sup>

## LEVERAGE PARTNERS’ EXPERTISE

Even the largest, most successful organization will be challenged to address workforce substance abuse issues on its own. Coordinating efforts with partner organizations can help ensure the success of efforts to maintain employees’ health and productivity through episodes of pain, psychological distress or substance abuse.

- Confirm that partners responsible for disability, absence management and stay-at-work/return-to-work programs have direct clinical expertise with substance use disorders and chronic pain issues.
- Ensure that drug testing procedures are conducted by federally certified labs that screen for opioids and verify that an attorney has reviewed and approved their testing policies and procedures.
- Partners can also be instrumental in ensuring that your policies conform to regulations such as the Health Insurance Portability and Accountability Act of 1996, Americans with Disabilities Act, Family and Medical Leave Act and local sick-leave laws.

## Appendix

### SAMPLE

The sample was taken from combined 2015-2017 National Surveys on Drug Use and Health (NSDUH).<sup>16</sup> This survey utilizes a computer-assisted interviewing method, with a 5-stage sampling approach in which first the state is stratified, then divided into state sampling regions. Census tracts were then selected in these regions, census block groups were selected within selected census tracts, and finally area segments were selected from within census tracts. Complete information about the sampling methodology for the NSDUH can be found in the methodological summary and definitions reports produced by the Substance Abuse and Mental Health Services Administration (SAMHSA) for each of the three years of analyzed data.<sup>17-19</sup> The non-workforce population (i.e., disabled, in school, under the age of 18) was excluded, for a total sample of 94,973. Of these, 66,589 were employed full-time (70%), 20,349 were employed part-time employed (21%), and 8,035 were unemployed at the time of the survey (8%). Those who were unemployed were not included in analyses exploring missed work day outcomes.

### VARIABLES

Our independent variables were type of use for 10 substances (medical: pain relievers, tranquilizers, stimulants, sedatives; legal: alcohol, tobacco; illicit: marijuana, cocaine, methamphetamines, heroin). Use categories were defined by SAMHSA:

| Type of Use (SAMHSA)                | Description  |
|-------------------------------------|--|
| No Use                              | Respondent has not used the substance in the past 12 months.   |
| Misuse<br>(medical substances only) | Use in any way not directed by a doctor, including use without a prescription of one's own medication, use in greater amounts, more often, or longer than told to take a drug, or use in any other way not directed by a doctor.   |
| Abuse                               | If respondent reports that a substance's use causes (a) serious problems at home, work or school, (b) actions that repeatedly got them in trouble with the law, (c) serious problems with family or friends and the respondent continued to use the substance despite these problems, or (d) the respondent to do something where the substance use might have put them in danger.   |
| Dependence                          | If respondent reports at least three of the following: (a) spent a great deal of time over a month getting, using, or getting over the effects of the substance, (b) unable to keep set limits on substance use, or use the substance more often than intended, (c) needed to use the substance more than before to get the desired effects, or noticed that using the same amount had a lesser effect than before, (d) unable to cut down or stop using the substance every time it was wanted, (e) continued to use the substance even though it was causing problems with emotions, nerves, mental health, or physical problems, (f) reduced or gave up participation in important activities due to substance use, (g) experienced substance specific withdrawal symptoms at one time that lasted for longer than a day after using. |

In order to improve comparability across substances, we created three categories of use: no use, non-problematic use and problematic use. Non-problematic use was established by a respondent who used but did not abuse or show dependence on a substance. Problematic use was established if a respondent was categorized with abuse or dependence on a substance.

## STATISTICAL ANALYSIS

All analyses were conducted using SAS software, version 9.4.<sup>20</sup> SAS proc survey procedures were used to account for the complex survey design of the sample. When reporting frequencies, Rao-Scott chi-square tests were obtained to test associations between the row and column variables and estimates and confidence limits were assessed for reported proportions.

Binary response models follow the linear logistic model, where  $\pi$  represents the probability of missed work days,  $\beta_0$  is the intercept,  $x$  is the independent variable, and  $\beta_1$  is the regression coefficient:

$$\text{logit}(\pi) \equiv \log\left(\frac{\pi}{1-\pi}\right) = \beta_0 + x\beta_1$$

Multiple linear regression is used to predict the number of missed workdays associated with substance use, by type of substance use, adjusted for demographic factors (sex, age, work status, education, insurance status, poverty status, self-reported health). Linear logistic regression models are fit by maximum likelihood, incorporating complex survey design accounting for stratification, clustering, and unequal weighting. Variances are determined by Taylor series to estimate the sampling errors. The modeled equation is below, where  $\hat{Y}$  is the predicted value of missed workdays.

$$\hat{Y} = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p$$

## DATA

Summary statistics for the sample are reported below.

**Table 1: Distribution of sample by demographic characteristics**

|                   | N     | % weighted (SE) |                  | N     | % weighted (SE) |
|-------------------|-------|-----------------|------------------|-------|-----------------|
| Year              |       |                 | Education        |       |                 |
| 2015              | 32040 | 33.0 (0.27)     | < High school    | 9803  | 9.5 (0.18)      |
| 2016              | 31407 | 33.3 (0.22)     | High school grad | 23985 | 22.7 (0.20)     |
| 2017              | 31526 | 33.7 (0.22)     | Some college     | 33023 | 32.5 (0.22)     |
| Sex               |       |                 | College grad     | 28162 | 35.3 (0.32)     |
| Men               | 46997 | 52.5 (0.20)     | Insurance Status |       |                 |
| Women             | 47976 | 47.5 (0.20)     | With insurance   | 83470 | 89.0 (0.17)     |
| Age               |       |                 | No insurance     | 11503 | 11.0 (0.17)     |
| 18-25             | 32397 | 16.3 (0.18)     | Poverty Status   |       |                 |
| 26-34             | 21779 | 19.6 (0.19)     | In poverty       | 14167 | 11.1 (0.18)     |
| 35-49             | 27566 | 30.4 (0.22)     | ≤ 2x FPT*        | 19129 | 17.2 (0.21)     |
| 50-64             | 10658 | 26.8 (0.29)     | >2x FPT*         | 61008 | 71.7 (0.31)     |
| ≥65               | 2573  | 6.8 (0.15)      | Health Status    |       |                 |
| Employment Status |       |                 | Excellent        | 23628 | 24.3 (0.22)     |
| Full time         | 66589 | 73.6 (0.22)     | Very good        | 38661 | 39.9 (0.24)     |
| Part time         | 20349 | 19.6 (0.19)     | Good             | 25576 | 27.9 (0.25)     |
| Unemployed        | 8035  | 6.8 (0.13)      | Fair/poor        | 7097  | 8.0 (0.12)      |

Note: categories may not add to 100% due to rounding

\*Federal Poverty Threshold

Data for Figures 3-5 in the report are shown below.

**Table 2: Predicted values from multiple logistic regression models reported in Figure 3**

|                  | Prescription or Legal Use |         | Misuse or Illicit Use |         | Abuse |         | Dependence |         | Total Use % |
|------------------|---------------------------|---------|-----------------------|---------|-------|---------|------------|---------|-------------|
|                  | %                         | (SE)    | %                     | (SE)    | %     | (SE)    | %          | (SE)    |             |
| <b>Medical</b>   |                           |         |                       |         |       |         |            |         |             |
| Pain Relievers   | 29.205                    | (0.201) | 4.170                 | (0.077) | 0.145 | (0.018) | 0.597      | (0.027) | 34.116      |
| Tranquilizers    | 11.043                    | (0.138) | 2.356                 | (0.063) | 0.094 | (0.010) | 0.148      | (0.015) | 13.641      |
| Stimulants       | 4.874                     | (0.095) | 2.392                 | (0.060) | 0.034 | (0.007) | 0.186      | (0.016) | 7.485       |
| Sedatives        | 5.401                     | (0.096) | 0.552                 | (0.028) | 0.012 | (0.004) | 0.032      | (0.007) | 5.997       |
| <b>Legal</b>     |                           |         |                       |         |       |         |            |         |             |
| Alcohol          | 69.850                    | (0.208) |                       |         | 3.439 | (0.074) | 3.712      | (0.067) | 77.000      |
| Tobacco          | 21.971                    | (0.171) |                       |         |       |         | 11.021     | (0.150) | 32.992      |
| <b>Illicit</b>   |                           |         |                       |         |       |         |            |         |             |
| Marijuana        |                           |         | 15.123                | (0.149) | 0.493 | (0.026) | 1.120      | (0.044) | 16.735      |
| Cocaine          |                           |         | 2.148                 | (0.067) | 0.117 | (0.018) | 0.279      | (0.022) | 2.544       |
| Methamphetamines |                           |         | 0.296                 | (0.023) | 0.045 | (0.009) | 0.263      | (0.025) | 0.604       |
| Heroin           |                           |         | 0.137                 | (0.017) | 0.015 | (0.004) | 0.232      | (0.018) | 0.383       |

**Table 3: Predicted values from multiple linear regression models reported in Figure 4**

|                  | No Use |         | Non-Problematic Use |         | Problematic Use |         |
|------------------|--------|---------|---------------------|---------|-----------------|---------|
|                  | Days   | (SE)    | Days                | (SE)    | Days            | (SE)    |
| <b>Medical</b>   |        |         |                     |         |                 |         |
| Pain Relievers   | 0.579  | (0.011) | 1.410               | (0.032) | 2.041           | (0.172) |
| Tranquilizers    | 0.768  | (0.010) | 1.480               | (0.054) | 1.913           | (0.289) |
| Stimulants       | 0.841  | (0.012) | 1.141               | (0.045) | 1.487           | (0.200) |
| Sedatives        | 0.829  | (0.011) | 1.425               | (0.083) | 1.728           | (0.422) |
| <b>Legal</b>     |        |         |                     |         |                 |         |
| Alcohol          | 0.933  | (0.032) | 0.815               | (0.012) | 1.152           | (0.044) |
| Tobacco          | 0.784  | (0.015) | 0.922               | (0.025) | 1.278           | (0.052) |
| <b>Illicit</b>   |        |         |                     |         |                 |         |
| Marijuana        | 0.813  | (0.012) | 1.097               | (0.031) | 1.453           | (0.087) |
| Cocaine          | 0.854  | (0.011) | 1.245               | (0.063) | 1.594           | (0.247) |
| Methamphetamines | 0.860  | (0.011) | 1.321               | (0.212) | 2.059           | (0.277) |
| Heroin           | 0.861  | (0.011) | 1.688               | (0.387) | 2.083           | (0.387) |

**Table 4: Predicted values from multiple linear regression models reported in Figure 5**

|                  | Non-Problematic Use |         |      |              | Problematic Use |         |      |              | Total Days Excess* |
|------------------|---------------------|---------|------|--------------|-----------------|---------|------|--------------|--------------------|
|                  | Days                | (SE)    | %    | Days Excess* | Days            | (SE)    | %    | Days Excess* |                    |
| <b>Medical</b>   |                     |         |      |              |                 |         |      |              |                    |
| Pain Relievers   | 0.756               | (0.040) | 33.4 | 252.3        | 1.218           | (0.172) | 0.7  | 9.0          | 261.4              |
| Tranquilizers    | 0.639               | (0.055) | 13.4 | 85.6         | 0.906           | (0.296) | 0.2  | 2.2          | 87.8               |
| Stimulants       | 0.238               | (0.050) | 7.3  | 17.3         | 0.434           | (0.194) | 0.2  | 1.0          | 18.2               |
| Sedatives        | 0.556               | (0.084) | 6.0  | 33.1         | 0.605           | (0.387) | 0.0  | 0.3          | 33.4               |
| <b>Legal</b>     |                     |         |      |              |                 |         |      |              |                    |
| Alcohol          | 0.057               | (0.036) | 69.8 | -39.8        | 0.218           | (0.055) | 7.2  | 15.6         | -24.2              |
| Tobacco          | 0.112               | (0.034) | 22.0 | 24.7         | 0.338           | (0.059) | 11.0 | 37.3         | 62.0               |
| <b>Illicit</b>   |                     |         |      |              |                 |         |      |              |                    |
| Marijuana        | 0.237               | (0.038) | 15.1 | 35.8         | 0.532           | (0.089) | 1.6  | 8.6          | 44.4               |
| Cocaine          | 0.324               | (0.062) | 2.1  | 7.0          | 0.552           | (0.229) | 0.4  | 2.2          | 9.1                |
| Methamphetamines | 0.240               | (0.220) | 0.3  | 0.7          | 0.968           | (0.291) | 0.3  | 3.0          | 3.7                |
| Heroin           | 0.643               | (0.392) | 0.1  | 0.9          | 0.926           | (0.387) | 0.2  | 2.3          | 3.2                |

\*In excess of those with no use

Adjusted for sex, age, work status, education, insurance status, poverty status, self-reported health

Summary statistics for pain reliever use reported below.

**Table 5: Distribution of reported pain reliever use**

| Medication                     | %       | SE       |
|--------------------------------|---------|----------|
| Hydrocodone                    | 19.0406 | (0.7477) |
| Vicodin                        | 15.0405 | (0.8633) |
| Tylenol with codeine<br>3 or 4 | 13.4619 | (0.6932) |
| Percocet                       | 9.3730  | (0.5565) |
| Tramadol                       | 7.3135  | (0.4901) |
| Norco                          | 6.2262  | (0.5206) |
| Oxycodone                      | 6.1122  | (0.4792) |
| Lortab                         | 4.1702  | (0.3020) |
| OxyContin                      | 3.5509  | (0.3541) |
| Suboxone                       | 2.5685  | (0.2429) |
| Codeine pills                  | 1.5605  | (0.2718) |
| Roxicodone                     | 1.3113  | (0.2150) |
| Methadone                      | 1.0487  | (0.2082) |
| Morphine                       | 0.8398  | (0.1763) |
| Ultram                         | 0.6568  | (0.1482) |
| Buprenorphine                  | 0.4667  | (0.1546) |
| Fentanyl                       | 0.4507  | (0.1252) |
| ER morphine                    | 0.3401  | (0.1335) |
| Opana                          | 0.3108  | (0.0955) |

| Medication                    | %      | SE       |
|-------------------------------|--------|----------|
| Dilaudid or<br>hydromorphone  | 0.3075 | (0.0818) |
| Percodan                      | 0.2465 | (0.0988) |
| ER tramadol                   | 0.1666 | (0.0949) |
| Ultracet                      | 0.1036 | (0.0682) |
| Roxicet                       | 0.1001 | (0.0443) |
| Ultram ER                     | 0.0954 | (0.0776) |
| Demerol                       | 0.0808 | (0.0619) |
| MS Contin                     | 0.0782 | (0.0512) |
| Opana ER                      | 0.0781 | (0.0328) |
| Buprenorphine +<br>naloxone   | 0.0513 | (0.0368) |
| Fentora                       | 0.0342 | (0.0207) |
| Duragesic                     | 0.0303 | (0.0220) |
| ER oxymorphone                | 0.0302 | (0.0165) |
| Oxymorphone                   | 0.0181 | (0.0125) |
| Kadian                        | 0.0133 | (0.0133) |
| Exalgo or<br>hydromorphone ER | 0.0116 | (0.0116) |
| Some other                    | 4.7114 | (0.4554) |

\*ER=extended release

**Table 6: Distribution of pain reliever use in the workforce population**

|                   | No Use  |          | Non-Problematic Use |          | Problematic Use |          | Problematic<br>Non –<br>problematic |
|-------------------|---------|----------|---------------------|----------|-----------------|----------|-------------------------------------|
|                   | %       | SE       | %                   | SE       | %               | SE       | %                                   |
| Year              |         |          |                     |          |                 |          |                                     |
| 2015              | 64.2743 | (0.4258) | 34.8466             | (0.4279) | 0.8791          | (0.0616) | 2.52                                |
| 2016              | 66.2675 | (0.4337) | 33.0082             | (0.4378) | 0.7243          | (0.0646) | 2.19                                |
| 2017              | 67.0803 | (0.3186) | 32.2948             | (0.3262) | 0.6249          | (0.0602) | 1.93                                |
| Sex               |         |          |                     |          |                 |          |                                     |
| Men               | 68.487  | (0.2593) | 30.6627             | (0.2613) | 0.8502          | (0.0469) | 2.77                                |
| Women             | 63.0106 | (0.3134) | 36.367              | (0.3108) | 0.6223          | (0.0466) | 1.71                                |
| Age               |         |          |                     |          |                 |          |                                     |
| 18-25             | 68.078  | (0.3386) | 30.9405             | (0.3307) | 0.9815          | (0.0719) | 3.17                                |
| 26-34             | 65.6501 | (0.3196) | 33.1976             | (0.3182) | 1.1524          | (0.1064) | 3.47                                |
| 35-49             | 65.404  | (0.3331) | 33.8875             | (0.3239) | 0.7085          | (0.0618) | 2.09                                |
| 50-64             | 65.4124 | (0.5876) | 34.104              | (0.5756) | 0.4836          | (0.0731) | 1.42                                |
| >=65              | 65.2909 | (0.9743) | 34.5608             | (0.9801) | 0.1483          | (0.0978) | 0.43                                |
| Employment Status |         |          |                     |          |                 |          |                                     |
| Full time         | 66.2584 | (0.2392) | 33.1086             | (0.2369) | 0.6331          | (0.0407) | 1.91                                |
| Part time         | 65.5858 | (0.4172) | 33.7099             | (0.4173) | 0.7044          | (0.0776) | 2.09                                |
| Unemployed        | 62.6736 | (0.8106) | 35.293              | (0.7897) | 2.0334          | (0.1836) | 5.76                                |
| Education         |         |          |                     |          |                 |          |                                     |
| < High school     | 68.7514 | (0.6172) | 30.1158             | (0.6241) | 1.1328          | (0.1169) | 3.76                                |
| High school grad  | 65.5474 | (0.4943) | 33.4958             | (0.4866) | 0.9569          | (0.0767) | 2.86                                |
| Some college      | 61.6333 | (0.3852) | 37.527              | (0.3793) | 0.8397          | (0.0636) | 2.24                                |
| College grad      | 69.2293 | (0.3287) | 30.3618             | (0.3303) | 0.4089          | (0.0520) | 1.35                                |
| Insurance Status  |         |          |                     |          |                 |          |                                     |
| With insurance    | 65.452  | (0.2445) | 33.8835             | (0.2430) | 0.6644          | (0.0376) | 1.96                                |
| No insurance      | 69.3807 | (0.5677) | 29.2498             | (0.5625) | 1.3695          | (0.1560) | 4.68                                |
| Poverty Status    |         |          |                     |          |                 |          |                                     |
| In poverty        | 65.2104 | (0.5346) | 33.4602             | (0.5332) | 1.3294          | (0.1246) | 3.97                                |
| ≤ 2x FPT*         | 65.5317 | (0.3691) | 33.5172             | (0.3638) | 0.9511          | (0.0941) | 2.84                                |
| >2x FPT*          | 66.0522 | (0.2641) | 33.3447             | (0.2602) | 0.6032          | (0.0419) | 1.81                                |
| Health Status     |         |          |                     |          |                 |          |                                     |
| Excellent         | 74.6875 | (0.5544) | 25.0683             | (0.5515) | 0.2442          | (0.0403) | 0.97                                |
| Very good         | 66.8416 | (0.2959) | 32.5473             | (0.2912) | 0.6111          | (0.0527) | 1.88                                |
| Good              | 60.5636 | (0.4868) | 38.4609             | (0.4875) | 0.9755          | (0.0868) | 2.54                                |
| Fair/poor         | 52.8903 | (0.6457) | 45.0322             | (0.6746) | 2.0776          | (0.2394) | 4.61                                |

\*Federal Poverty Threshold

Note: Problematic / Non-problematic use is the percent of problematic users to non-problematic users for each category

## References

- <sup>1</sup> U.S. Department of Health and Human Services. HHS Acting Secretary Declares Public Health Emergency to Address National Opioid Crisis. Washington, DC: HHS; October 26, 2017. <https://www.hhs.gov/about/news/2017/10/26/hhs-acting-secretary-declares-public-health-emergency-address-national-opioid-crisis.html>.
- <sup>2</sup> Centers for Disease Control and Prevention. 2018 Annual Surveillance Report of Drug-Related Risks and Outcomes—United States. Washington, DC: HHS; 2018. <https://www.cdc.gov/drugoverdose/pdf/pubs/2018-cdc-drug-surveillance-report.pdf>.
- <sup>3</sup> Hser YI, Evans E, Grella C, et al. Long-term course of opioid addiction. *Harvard Review of Psychiatry*. 2015;23(2):76-89. doi: 10.1097/HRP.000000000000052.
- <sup>4</sup> Birnbaum HG, White AG, Schiller M, et al. Societal costs of prescription opioid abuse, dependence, and misuse in the United States. *Pain Medicine*. 2011;12(4):657-67. doi: 10.1111/j.1526-4637.2011.01075.x.
- <sup>5</sup> Goplerud E, Hodge S, Benham T. A substance use cost calculator for US employers with an emphasis on prescription pain medication misuse. *Journal of Occupational and Environmental Medicine*. 2017;59(11):1063-71. doi: 10.1097/JOM.0000000000001157.
- <sup>6</sup> Meyer R, Patel AM, Rattana SK, et al. Prescription opioid abuse: A literature review of the clinical and economic burden in the United States. *Population Health Management*. 2014;17(6):372-87. doi: 10.1089/pop.2013.0098.
- <sup>7</sup> Gold J. “Workers Overdose on the Job, and Employers Struggle to Respond.” *New York Times*. September 22, 2018. <https://www.nytimes.com/2018/09/21/business/economy/opioid-overdose-workplace.html>.
- <sup>8</sup> Kowalski-McGraw M, Green-McKenzie J, Pandalai SP, et al. Characterizing the interrelationships of prescription opioid and benzodiazepine drugs with worker health and workplace hazards. *Journal of Occupational and Environmental Medicine*. 2017;59(11):1114-26. doi: 10.1097/JOM.0000000000001154.
- <sup>9</sup> Noguchi Y. “Now Hiring: A Company Offers Drug Treatment and a Job to Addicted Applicants” (podcast). National Public Radio. July 27, 2018. <https://www.npr.org/2018/07/27/631557443/now-hiring-a-company-offers-drug-treatment-and-a-job-to-addicted-applicants>.
- <sup>10</sup> Gaspar FW, Kownacki R, Zaidel CS, et al. Reducing disability durations and medical costs for patients with a carpal tunnel release surgery through the use of opioid prescribing guidelines. *Journal of Occupational and Environmental Medicine*. 2017;59(12):1180-87. doi: 10.1097/JOM.0000000000001168.
- <sup>11</sup> Compton WM, Jones CM, Baldwin GT. Relationship between nonmedical prescription-opioid use and heroin use. *New England Journal of Medicine*. 2016;374(2):154-63. doi: 10.1056/NEJMra1508490.
- <sup>12</sup> U.S. Department of Health and Human Services, Office of the Surgeon General. *Facing Addiction in America: The Surgeon General’s Report on Alcohol, Drugs, and Health*. Washington, DC: HHS; November 2016. <https://addiction.surgeongeneral.gov/sites/default/files/surgeon-generals-report.pdf>.
- <sup>13</sup> Pransky G. Preventing Opioid Deaths: An Opportunity to Integrate Health and Disability Management. *Disability Management Employer Coalition*. 2018. <http://dmec.org/2018/11/12/integrated-absence-management-preventing-opioid-deaths/>.
- <sup>14</sup> U.S. Department of Health and Human Services, Office of the Surgeon General. *Facing Addiction in America: The Surgeon General’s Spotlight on Opioids*. Washington, DC: HHS; September 2018. [https://addiction.surgeongeneral.gov/sites/default/files/Spotlight-on-Opioids\\_09192018.pdf](https://addiction.surgeongeneral.gov/sites/default/files/Spotlight-on-Opioids_09192018.pdf).

<sup>15</sup> Larios SE, Manuel JK, Newville H, et al. "Evidence-Based Treatment." In: Miller PM, ed., *Interventions for Addiction*. Amsterdam: Elsevier; 2013.

<sup>16</sup> United States Department of Health and Human Services. Substance Abuse and Mental Health Services Administration. Center for Behavioral Health Statistics and Quality. *National Survey on Drug Use and Health, 2016*. 34481-v3. Research Triangle Park, NC: RTI International [distributor]; 2016. <http://doi.org/10.3886/34481.v3>.

<sup>17</sup> Center for Behavioral Health Statistics and Quality. *2015 National Survey on Drug Use and Health: Methodological summary and definitions*. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2016. <https://www.samhsa.gov/data/sites/default/files/NSDUH-MethodSummDefsHTML-2015/NSDUH-MethodSummDefsHTML-2015/NSDUH-MethodSummDefs-2015.htm>

<sup>18</sup> Center for Behavioral Health Statistics and Quality. *2016 National Survey on Drug Use and Health: Methodological summary and definitions*. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2017. <https://www.samhsa.gov/data/sites/default/files/NSDUH-MethodSummDefs-2016/NSDUH-MethodSummDefs-2016.htm>

<sup>19</sup> Center for Behavioral Health Statistics and Quality. *2017 National Survey on Drug Use and Health: Methodological summary and definitions*. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2018. <https://www.samhsa.gov/data/report/2017-methodological-summary-and-definitions>

<sup>20</sup> SAS Institute Inc. *SAS version 9.4*. Cary, NC: SAS Institute Inc; 2013.



## About IBI

Founded in 1995, the Integrated Benefits Institute (IBI) is a national, nonprofit research and educational organization focused on workforce health and productivity. IBI provides data, research, tools and engagement opportunities to help business leaders make sound investments in their employees' health. IBI is supported by more than 1,000 member companies representing over 20 million workers.

IBI's Board of Directors includes the following leaders in health and productivity:

- AbbVie
- Amgen
- Anthem
- Aon Hewitt
- Autozone
- Buck Consulting
- Cigna
- Comcast
- Goodyear Tire and Rubber Company
- The Hartford
- Health Care Service Corporation
- The Home Depot
- IBM
- Johnson & Johnson
- Lincoln Financial Group
- Mercer
- MMA-Trion
- Novo Nordisk
- Pfizer
- Progressive Casualty Insurance Company
- Prudential Financial
- Sanofi
- Sedgwick
- Standard Insurance Company (The Standard)
- Sun Life Financial
- Teladoc Health
- UnitedHealthcare
- USAA
- Walmart
- WorkPartners
- Willis Towers Watson
- Zurich Insurance Group

Integrated Benefits Institute  
1901 Harrison Street, Suite 1100  
Oakland, CA 94612  
(415) 222-7280  
[ibiweb.org](http://ibiweb.org)