



HEALTH AND PRODUCTIVITY IMPACT OF CHRONIC CONDITIONS

DEPRESSION AND OTHER MOOD DISORDERS

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Executive Summary: Health and Productivity Impact of Depression and Other Mood Disorders

- Of a nationally representative sample of employed U.S. adults, 8% had treatments for depression or other mood disorders (ICD-9 diagnosis codes 296.xx or 311.xx).
- Excess medical and pharmacy treatment costs for employees with mood disorders averaged about \$2,700 per year.
- Employees with mood disorders had an average of 2.4 excess sick days per year, at a cost of about \$640 in wages and benefits.
- Each year, employers' short-term disability (STD) insurance policies experience an average of 2.2 new claims for mood disorders per 1,000 covered lives. STD claims for mood disorders incur an average of 49 lost workdays, at an average cost of about \$9,800 in wage replacements and paid employee benefits.
- Each year, employers' long-term disability (LTD) insurance policies manage an average of 1.1 active claims for mood disorders per 1,000 covered lives. Of LTD claims for mood disorders, 15% remain open two years after they begin. LTD claims for mood disorders incur an average of 153 lost workdays per year that they remain open, at an average cost of about \$20,000 in wage replacements and paid employee benefits per year.
- Overall, for every 1,000 U.S. employees, mood disorders in the workforce costs about \$324,000 in excess healthcare treatments and lost work time. This does not include the value of returns to lost labor inputs, early exits from the labor force, excess turnover costs and presenteeism (underperformance on the job due to mood disorders).
- Considerable cost differences are observed across industries, ranging from about \$40,000 per 1,000 employees in construction to about \$524,000 per 1,000 employees in finance.

Introduction to This Series

Helping employees manage chronic illnesses remains one of the most viable strategies for reducing employers' healthcare and disability costs. IBI's *Health and Productivity Impact of Chronic Conditions* series uses high-quality data to model healthcare, illness absence (i.e., sick days) and disability costs for populations of employees across different industries. The results provide a scalable cost benchmark that employers and their supplier partners can use to assess the potential savings from reductions in the prevalence of a condition, costs of treatments, and illness-related absences and disability leaves.

Data

The series uses data primarily from two sources.

Data from the Agency for Healthcare Research and Quality's (AHRQ's) *Medical Expenditure Panel Survey* (MEPS) are used for healthcare costs and illness absences.¹ MEPS collects annual, nationally representative information about health status, care utilization and treatment costs from components: (1) a survey of U.S. households, with information supplemented by data from household members' medical providers (the household component); and (2) a separate survey of employers about their employment-based health insurance plans (the insurance component). This report uses person-level data from the 2011–2014 household component files for information about health conditions, healthcare costs, illness absences, and demographic and occupational/industrial characteristics.

Data from IBI's *Health and Productivity Benchmarking System* (referred to simply as *Benchmarking*)² are used for short-term disability (STD) and long-term disability (LTD) outcomes. Each year, *Benchmarking* collects millions of STD and LTD claims from the books of business of 14 of the largest U.S. disability insurance carriers and third-party administrators. This report uses claims data for calendar years 2011–2015 for information on diagnoses, claims rates, durations and industry.

This report also incorporates information about wages and benefits from the U.S. Bureau of Labor Statistics (BLS) and healthcare cost growth estimates from the Centers for Medicare & Medicaid Services. Detailed information about the data and analytic methods is included in the appendix.

Methods

Attributing healthcare costs and illness absences to specific conditions poses well-known challenges. This is primarily due to the presence of comorbidities that can impact the severity of illness symptoms and the efficacy or intensity of care management.³ For this reason, we control for the presence of other chronic conditions for analyses of healthcare costs and illness absences in a way that permits us to compare the excess burdens for persons with a specific condition, over and above the burdens associated with their other conditions. See the appendix for details on the models. Lost work time and costs associated with disability claims are more straightforward—no detail on comorbidities is provided, so only average outcomes are reported. All outcomes are reported on an annual basis.

¹ AHRQ. *Medical Expenditure Panel Survey*. https://meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp

² Integrated Benefits Institute. *Health and Productivity Benchmarking*. <https://ibiweb.org/tools/benchmarking>

³ Alonso J, Vilagut G, Chatterji S et al. Including information about comorbidity in estimates of disease burden: Results from the WHO World Mental Health Surveys. *Psychological Medicine*. 2011;41(4):873–86.

Definitions of Conditions and Industries

CONDITIONS

Conditions are defined using the *International Classification of Diseases*, 9th revision (ICD-9),⁴ based on the three-digit diagnosis categories available in the MEPS data. *Benchmarking* data contain full ICD-9 diagnosis information, which is truncated to conform to the MEPS three-digit reporting. Individuals in the MEPS data are determined to have a condition based on records in the medical conditions files of the household component. *Benchmarking* disability claims record only the primary claim diagnosis.

INDUSTRIES

MEPS data record the industry of an employee's current (or past) employer. These include the following civilian categories:

- Natural resources
- Mining
- Construction
- Manufacturing
- Wholesale and retail trade
- Transportation and utilities
- Information
- Financial activities
- Professional and business services
- Education, health and social services
- Leisure and hospitality
- Other services
- Public administration

Given the small sample sizes in the MEPS data, mining is combined with natural resources. *Benchmarking* claims contain North American Industrial Classification System (NAICS) codes, in many cases to the six-digit coding level. To conform to MEPS, NAICS sectors are combined to create major industries, as described in the following table.

HIPCC industry	NAICS sectors
Natural resources	<ul style="list-style-type: none">• Agriculture, forestry, fishing and hunting• Mining, quarrying, and oil and gas extraction
Construction	<ul style="list-style-type: none">• Construction
Manufacturing	<ul style="list-style-type: none">• Manufacturing
Wholesale and retail trade	<ul style="list-style-type: none">• Wholesale trade• Retail trade
Transportation and utilities	<ul style="list-style-type: none">• Transportation and warehousing• Utilities
Information	<ul style="list-style-type: none">• Information
Financial activities	<ul style="list-style-type: none">• Finance and insurance• Real estate and rental and leasing

⁴ World Health Organization. *International Classification of Diseases (ICD)*, 9th revision. <http://www.who.int/classifications/icd/en>

HIPCC industry	NAICS sectors
Professional and business services	<ul style="list-style-type: none"> Professional, scientific and technical services Management of companies and enterprises Administrative and support and waste Management and remediation services
Education, health and social services	<ul style="list-style-type: none"> Educational services Healthcare and social assistance
Leisure and hospitality	<ul style="list-style-type: none"> Arts, entertainment and recreation Accommodation and food services
Other services	<ul style="list-style-type: none"> Other services (except public administration)
Public administration	<ul style="list-style-type: none"> Public administration

DEPRESSION AND OTHER MOOD DISORDERS

Introduction

For the purpose of this report, mood disorders are indicated as diagnoses for treatment or disability benefits with ICD-9 codes 296.xx or 311.xx. The most common diagnosis is depression, but other diagnoses include bipolar disorder and cyclothymia.

Prevalence

HOW MANY EMPLOYEES HAVE MOOD DISORDERS?

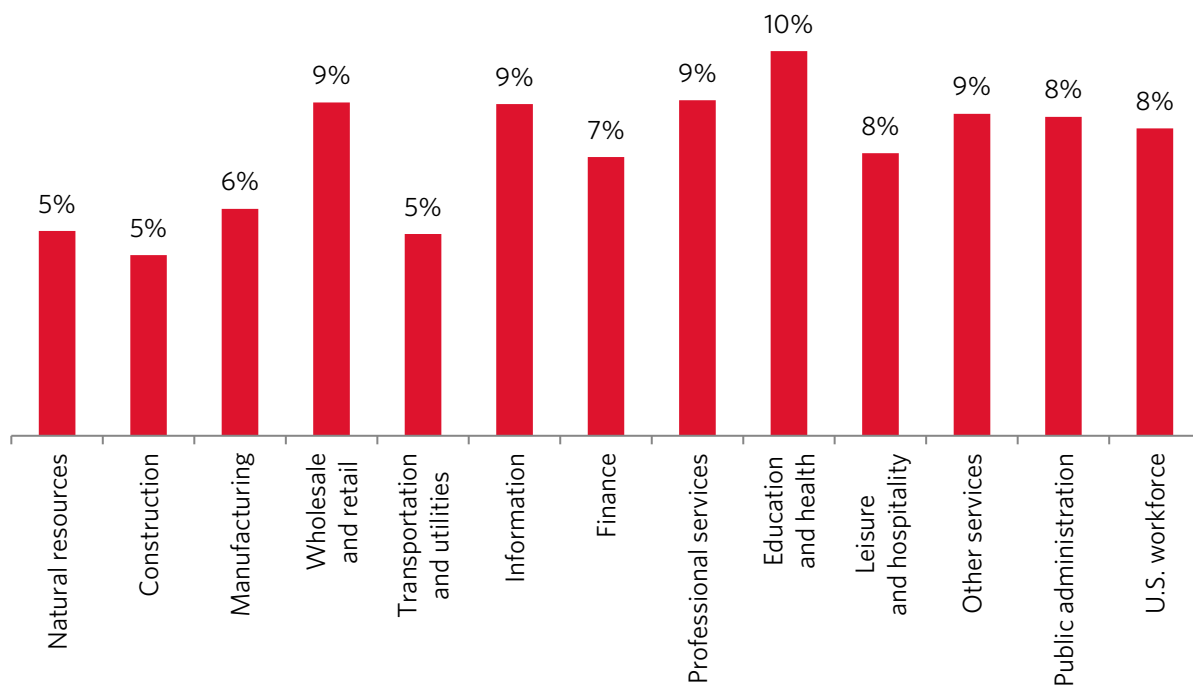


Figure 1

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Study, 2011-2014.

WHAT OTHER CONDITIONS (COMORBIDITIES) AFFLICT EMPLOYEES WITH MOOD DISORDERS?

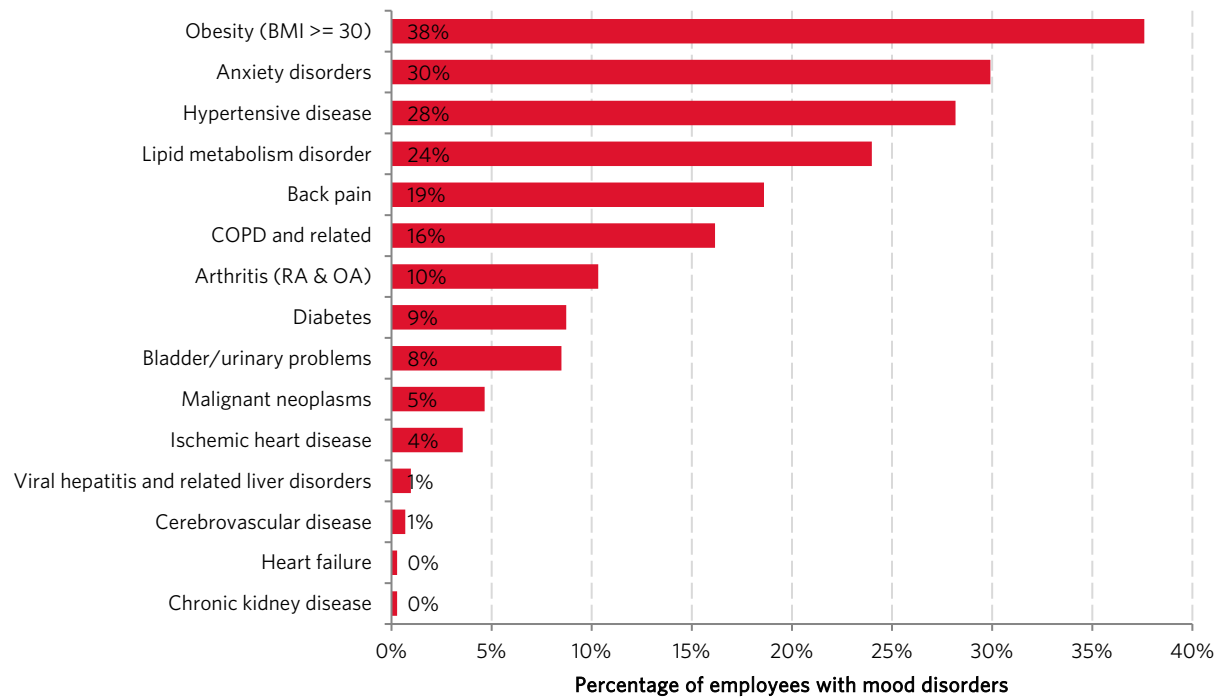


Figure 2

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Study, 2011-2014. BMI = body mass index. COPD = chronic obstructive pulmonary disease. RA = rheumatoid arthritis. OA = osteoarthritis.

Treatment Costs

HOW MUCH ARE MEDICAL/RX TREATMENT COSTS FOR EMPLOYEES WITH MOOD DISORDERS?

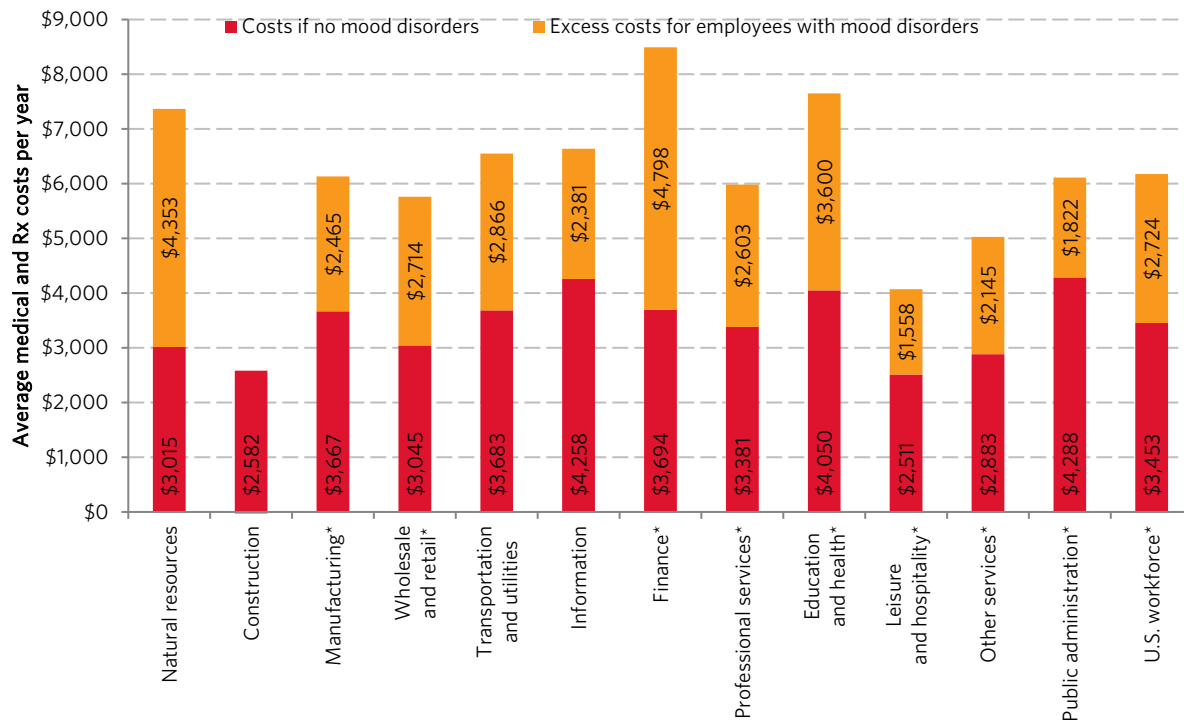


Figure 3

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Study, 2011-2014. Costs include expenses for all medical and pharmacy treatment, regardless of reason. Costs are estimated from multivariate regression models controlling for other comorbid chronic conditions, age, sex, race and ethnicity. An asterisk (*) next to an industry label indicates that the estimated excess costs for employees with mood disorders are statistically significant below the 0.05 level. For industries without an asterisk, a combination of a small sample of employees and wide variation in costs prevent us from confidently estimating that the excess costs are significantly different from \$0. Readers should interpret findings for industries without an asterisk cautiously. See the appendix for details on the model.

Illness Absences

HOW OFTEN ARE EMPLOYEES WITH MOOD DISORDERS ABSENT FROM WORK DUE TO ILLNESS?

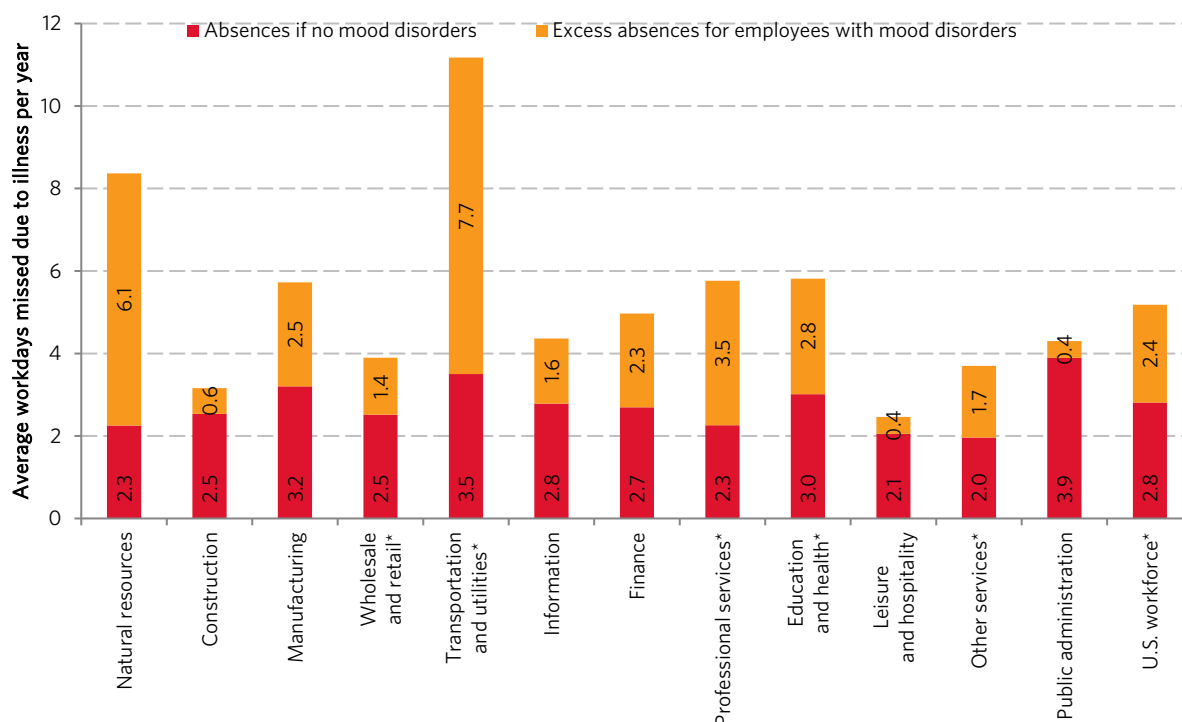


Figure 4

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Study, 2011–2014. Illness absences are estimated from multivariate, negative binomial regression models controlling for other comorbid chronic conditions, age, sex, race and ethnicity. An asterisk (*) next to an industry label indicates that the estimated excess absences for employees with mood disorders are statistically significant below the 0.05 level. For industries without an asterisk, a combination of a small sample of employees and wide variation in absences prevent us from confidently estimating that the excess absences are significantly different from 0 days. Readers should interpret findings for industries without an asterisk cautiously. See the appendix for details on the model.

WHAT ARE THE COSTS OF ILLNESS ABSENCES FOR EMPLOYEES WITH MOOD DISORDERS?

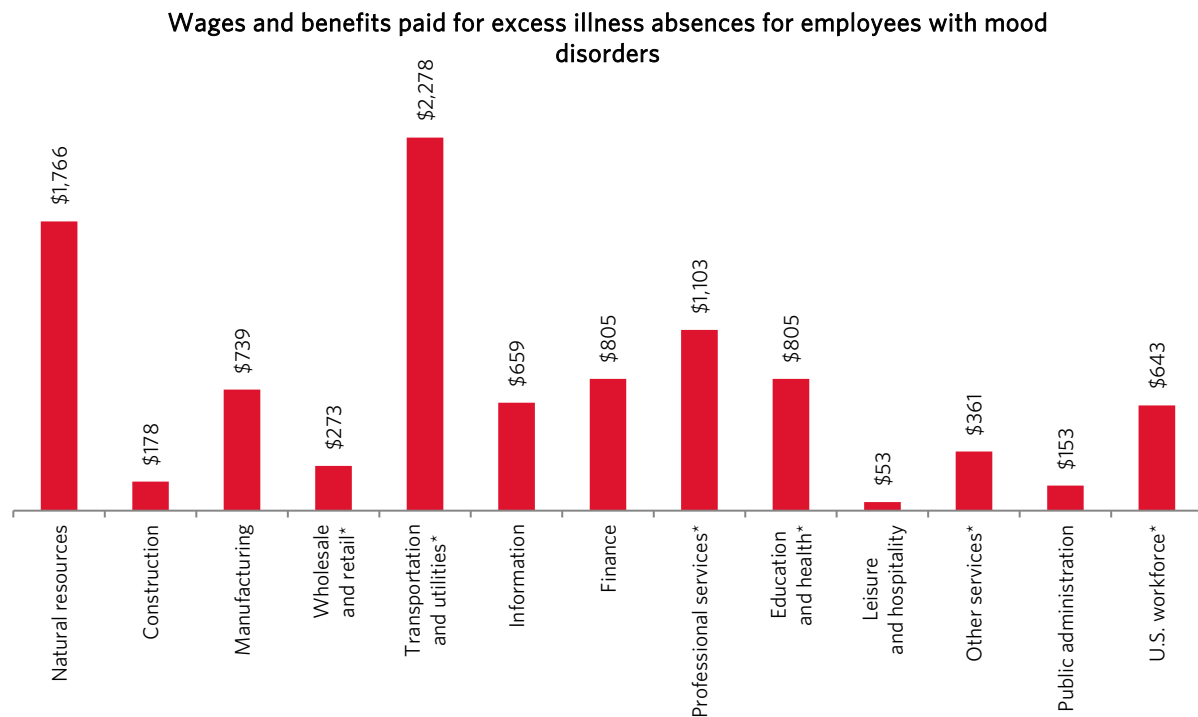


Figure 5

See Figure 4 for sources and interpretation of starred industries. Estimates assume that all employees are eligible for paid sick days.

STD Outcomes

HOW OFTEN DO EMPLOYEES TAKE STD LEAVE FOR MOOD DISORDERS?

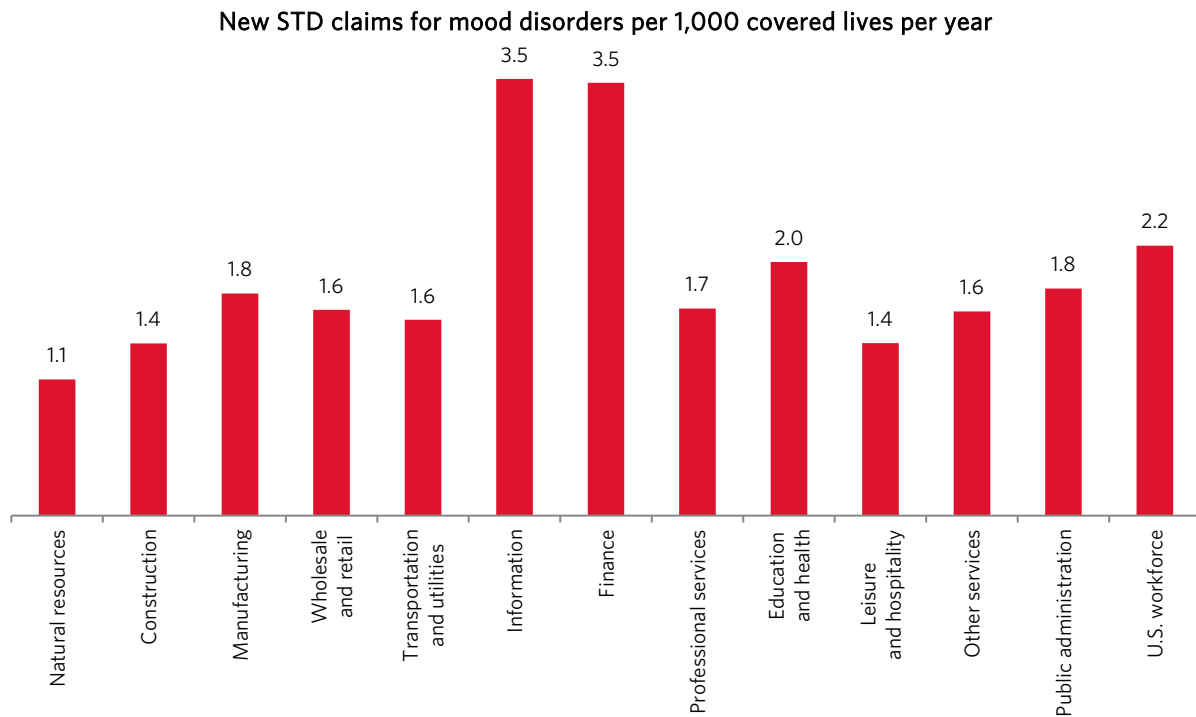


Figure 6

Source: Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011–2015.

HOW LONG IS THE AVERAGE STD CLAIMANT FOR MOOD DISORDERS AWAY FROM WORK?

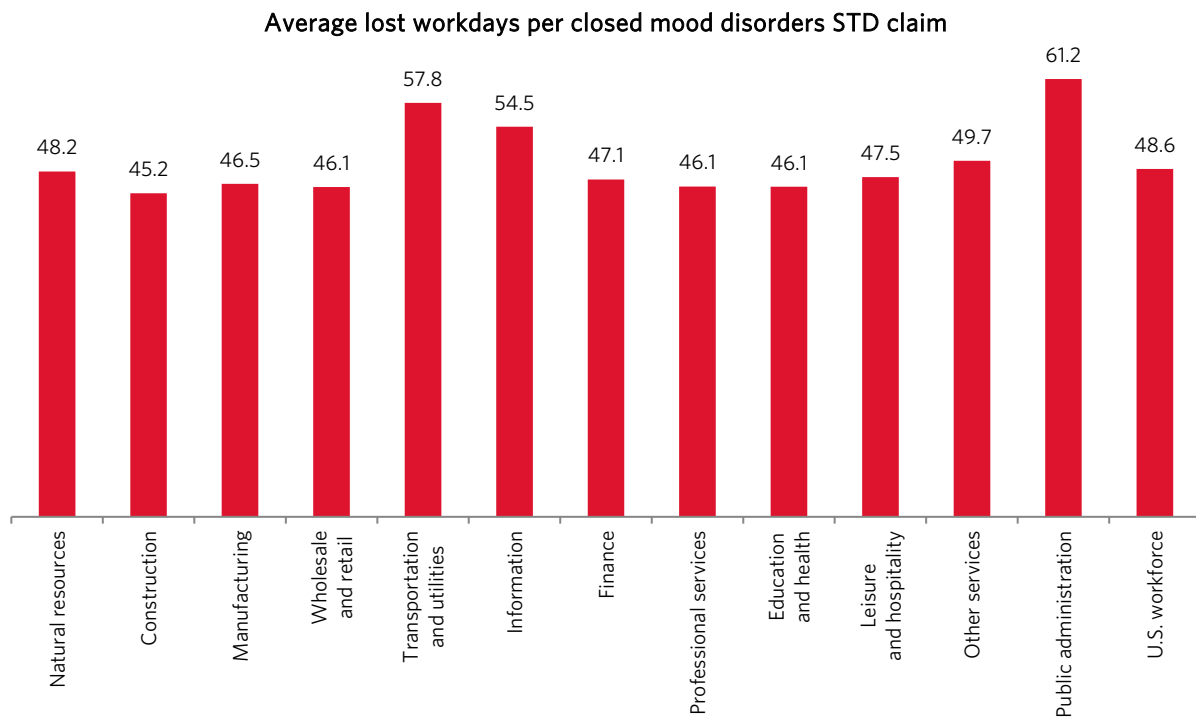


Figure 7

Source: Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011-2015.

HOW MUCH DOES THE AVERAGE STD CLAIM FOR MOOD DISORDERS COST?

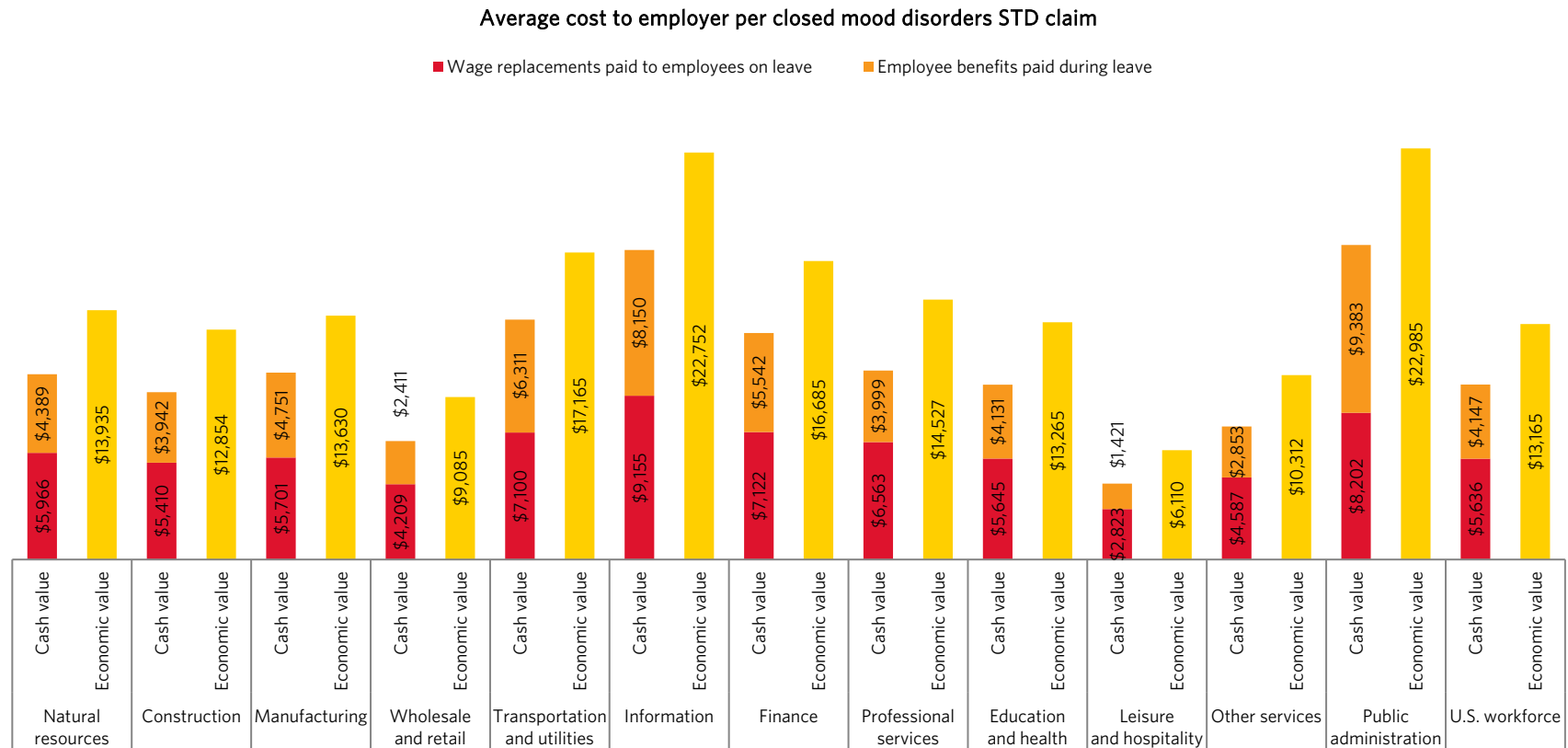


Figure 8

See Figure 7 for source and the appendix for cost estimation method. *Cash value* refers to compensation to employees on STD leave, including benefits continuation. *Economic value* refers to the marginal product of lost labor inputs and is estimated by average daily wages and benefits. Cash and economic value represent distinct ways of valuing lost productivity and should not be combined. See the appendix for more information.

LTD Outcomes

HOW MANY EMPLOYEES ARE ON LTD LEAVE FOR MOOD DISORDERS OVER A GIVEN YEAR?

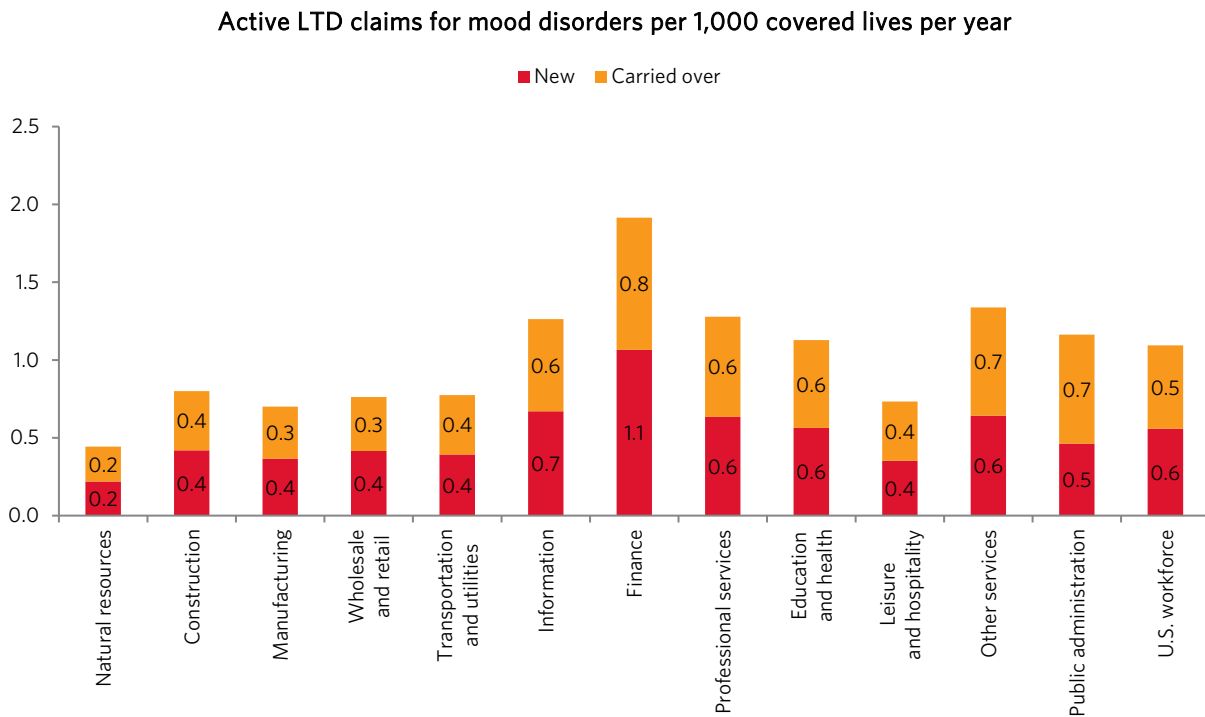


Figure 9

Source: Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011–2015. New claims began within an observed data year. Carried-over claims began prior to an observed data year.

HOW MANY LTD CLAIMS CLOSE WITHIN TWO YEARS?

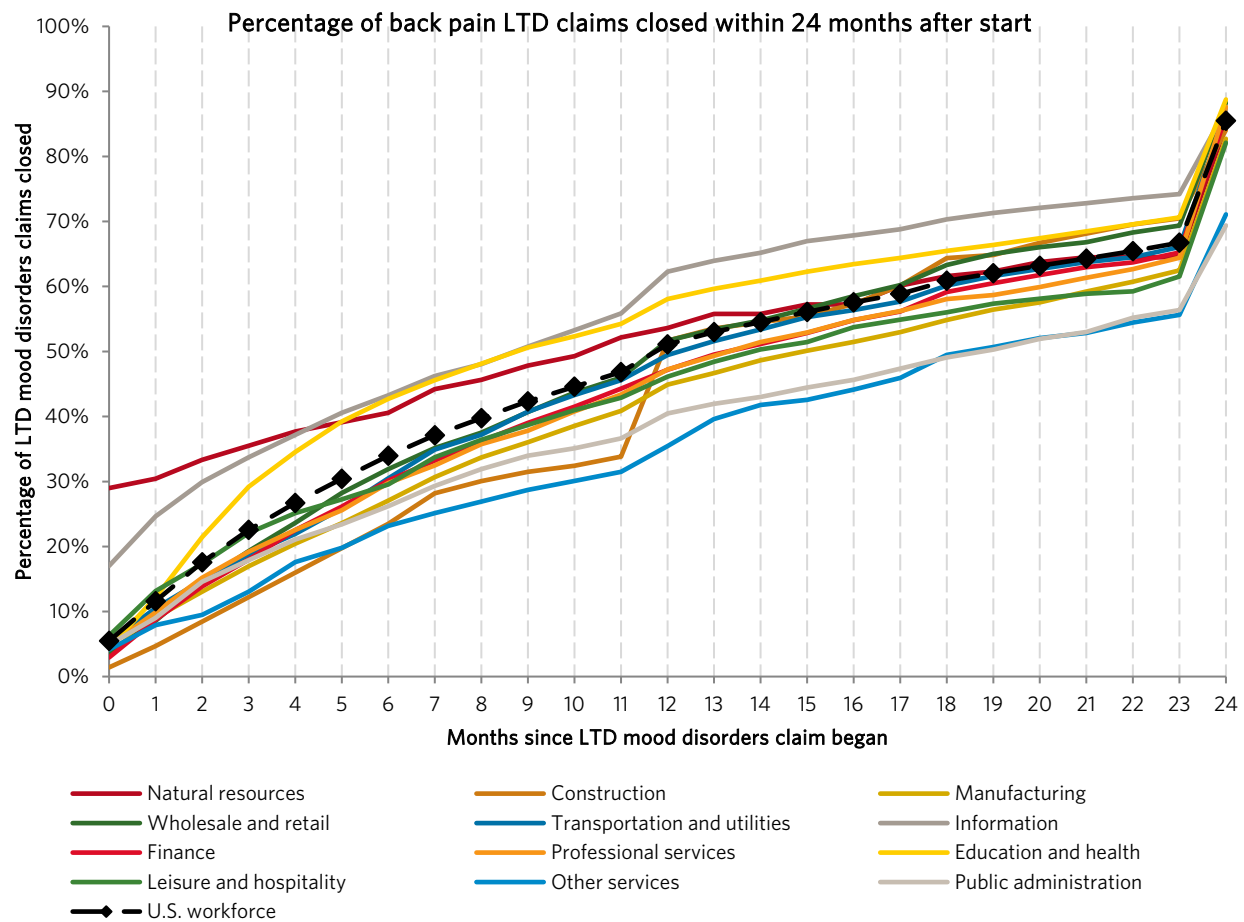


Figure 10

Source: Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011-2015. Analysis is limited to claims with a start date from 2011 to 2013 to provide adequate observation time.

HOW MUCH OF EACH WORK YEAR IS LOST BY THE AVERAGE LTD CLAIMANT FOR MOOD DISORDERS?

Average calendar-year lost workdays per active LTD mood disorders claim

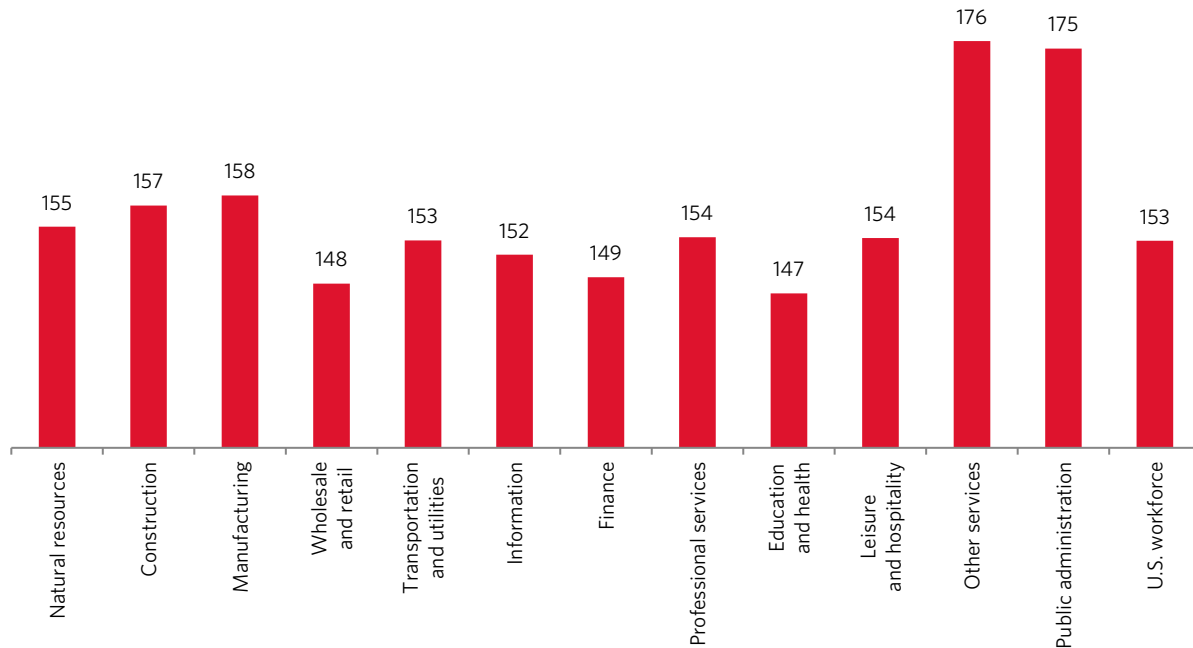


Figure 11

Source: Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011-2015. Days for LTD claims represent wage replacements for lost workdays occurring within a calendar year. This includes claims that began within a calendar year and claims that carried over from previous calendar years.

HOW MUCH DOES THE AVERAGE LTD CLAIM FOR MOOD DISORDERS COST EACH YEAR?

Average calendar-year costs per active LTD mood disorders claim



Figure 12

See Figure 11 for source and the appendix for cost estimation method.

Total Costs of Mood disorders in a Workforce

WHAT ARE THE ESTIMATED ANNUAL COSTS ASSOCIATED WITH MOOD DISORDERS IN A 1,000-PERSON WORKFORCE?

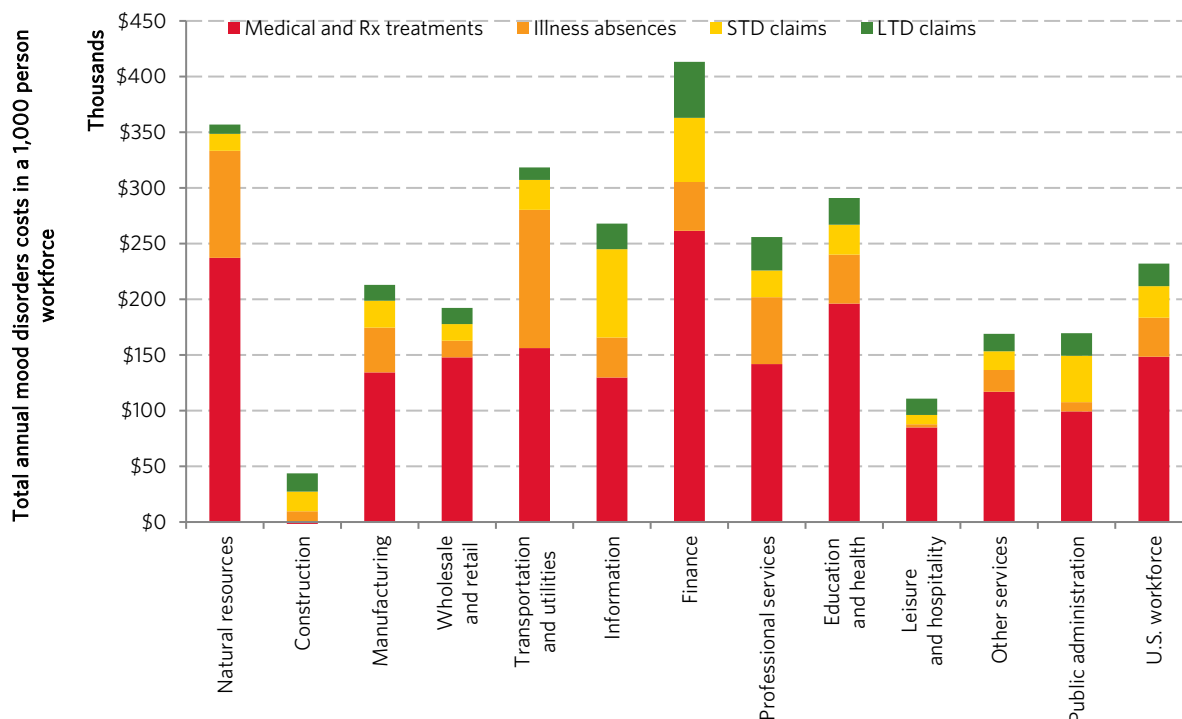


Figure 13

Sources: Agency for Healthcare Research and Quality, Medical Expenditure Panel Study, 2011-2014; Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011-2015; Bureau of Labor Statistics. Treatment costs and illness absence days are calculated by the product of the prevalence of mood disorders and the average excess outcomes for employees with mood disorders (see previous charts in this section). Costs for illness absences and STD claims represent the economic value of lost labor inputs from absences. They are calculated by applying industry-average 2015 daily wage and benefits estimates from BLS to the total number of estimated lost workdays. See the appendix for more information. Costs for LTD claims represent wage replacements for lost workdays occurring within a calendar year. Costs assume that all employees are eligible for illness absence, STD benefits and LTD benefits or for other benefits that allow them to take time off from work due to mood disorders. Analysis of STD is limited to claims with a start date from 2011 to 2014 to provide adequate time to observe a claim closure. Analysis of LTD is limited to claims from data years 2012 to 2015 to observe lost workdays from both new and carried-over claims.

For clarity, the data presented in Figure 13 is reported in Table 1.

Table 1: Estimates of annual costs associated with mood disorders in a 1,000-person workforce

	Medical and Rx treatments	Illness absences	STD claims	LTD claims	Total
Natural resources	\$237,212	\$96,220	\$15,146	\$8,309	\$356,888
Construction	-\$2,167	\$8,552	\$17,662	\$16,390	\$40,438
Manufacturing	\$148,883	\$44,625	\$24,169	\$14,173	\$231,850
Wholesale and retail	\$240,763	\$24,198	\$14,929	\$14,593	\$294,482
Transportation and utilities	\$153,928	\$122,333	\$26,844	\$11,209	\$314,314
Information	\$210,264	\$58,162	\$79,316	\$23,016	\$370,758
Finance	\$356,025	\$59,718	\$57,657	\$50,293	\$523,693
Professional services	\$232,412	\$98,500	\$24,009	\$29,893	\$384,814
Education and health	\$368,639	\$82,432	\$26,850	\$24,026	\$501,946
Leisure and hospitality	\$117,179	\$3,954	\$8,411	\$14,609	\$144,153
Other services	\$183,852	\$30,915	\$16,810	\$15,618	\$247,195
Public administration	\$154,677	\$12,952	\$41,667	\$20,251	\$229,547
U.S. workforce	\$222,830	\$52,577	\$28,375	\$20,273	\$324,055

Sources: Agency for Healthcare Research and Quality, Medical Expenditure Panel Study, 2011–2014; Integrated Benefits Institute, Health and Productivity Benchmarking database, 2011–2015; Bureau of Labor Statistics. Treatment costs and illness absence days are calculated by the product of the prevalence of mood disorders and the average excess outcomes for employees with mood disorders (see previous charts in this section). Costs for illness absences and STD claims represent the economic value of lost labor inputs from absences. They are calculated by applying industry-average 2015 daily wage and benefits estimates from BLS to the total number of estimated lost workdays. See the appendix for more information. Costs for LTD claims represent wage replacements for lost workdays occurring within a calendar year. Costs assume that all employees are eligible for illness absence, STD benefits and LTD benefits or for other benefits that allow them to take time off from work due to mood disorders. Analysis of STD is limited to claims with a start date from 2011 to 2014 to provide adequate time to observe a claim closure. Analysis of LTD is limited to claims from data years 2012 to 2015 to observe lost workdays from both new and carried-over claims.

Evidence for Workplace Interventions

Several sources offer good starting points for crafting strategies to manage the full costs of depression. Examples include:

- Research suggests that medication and psychotherapy is effective in 70%-80% of depression cases.⁵ However, depression tends to be underdiagnosed and undertreated. Providing access to employee assistance programs (EAP) and employing a mental health screener (such as the PHQ-9) that employees can discuss with their regular health care providers may help connect at-risk employees to beneficial care resources.
- Occupational therapy has been shown to reduce the duration of temporary disability from work for depression.⁶
- Depression management can improve employee's effective hours worked as a result of better retention and fewer absences.⁷

⁵ RAND. The Societal Promise of Improving Care for Depression, 2008, http://www.rand.org/pubs/research_briefs/RB9055-1.html

⁶ See for example Désiron, HAM., de Rijk, A, Van Hoof, E, Donceel, P. Occupational Therapy and Return to Work: a Systematic Literature Review. *BMC Public Health*, 2011; 11(1), 615.

⁷ Lerner, D, Rodday, AM, Cohen, JT, & Rogers, WH. A Systematic Review of the Evidence Concerning the Economic Impact of Employee-Focused Health Promotion and Wellness Programs. *Journal of Occupational and Environmental Medicine*, 2013; 55(2), 209-222; RAND, *ibid*.

Additional Information about Depression and Mood Disorders

More information about the causes, treatment and prevention of low depression can be found at the following sources:

[National Institute of Mental Health's \(NIHM\) depression page](#)

[American Psychological Association's depression page](#)

Appendix

SUPPLEMENTAL DATA

To estimate the costs for each lost workday, we apply industry-average daily wages in 2015 from the BLS's Occupational Employment Statistics (OES) program.⁸ We also include an estimate of payments for employee benefits such as healthcare, retirement, and mandatory programs from the BLS's National Compensation Survey.⁹

Our estimates assume a population of employees that is 100% eligible for paid sick days and for STD and LTD benefits. The economic value of each lost workday is the sum of average daily wages and benefits. For the cash value of disability absences, we assume that employees are paid 100% of their daily benefits, but only a portion of their wages based on their industry's average wage replacement rate as a fixed percent of annual earnings reported in the BLS's Employee Benefits Survey.¹⁰ The STD wage replacement rate was 63% for the U.S. workforce, ranging from 59% to 65% across industries. For LTD, the average replacement rate was 58%, ranging from 57% to 61%.

Healthcare treatment costs in the MEPS data are reported in current dollars. We inflate all costs to 2015 dollars using the chain-weighted national health expenditures deflator reported in 2016 by the Centers for Medicare and Medicaid Services (CMS), Office of the Actuary.¹¹

REGRESSION MODELS

Our analyses of healthcare costs and illness absences using the MEPS data employ multivariate regression methods to isolate marginal results on average of employees' demographics and other comorbidities. The basic form of the model is:

$$\hat{Y} = \alpha + \beta_1 \text{Chronic} + \beta_2 \text{Any other chronic} + \beta_3 \text{Chronic} \times \text{Any other chronic} + \sum \beta_k \text{Demographics} + \varepsilon$$

Equation 1

⁸ BLS, Occupational Employment Statistics (OES), 2015; <https://www.bls.gov/oes/home.htm>

⁹ BLS, National Compensation Survey, Employer Costs of Employee Compensation, 2015; <https://www.bls.gov/ncs/>

¹⁰ BLS, Employee Benefits Survey, 2015; https://www.bls.gov/ncs/ebs/benefits/2015/benefits_life.htm

¹¹ Martin AB, Hartman M, Washington B, Catlin A, National Health Expenditure Accounts Team. National health spending: faster growth in 2015 as coverage expands and utilization increases. *Health Affairs*. 2016; Dec 2:10-377.

Where \hat{Y} is the predicted value of the outcome, α is the constant intercept if all variables in the model equal zero, and ε is the error term. β_1 is the marginal increase or decrease in the outcome for employees with the focal chronic condition (in this case, depression and other mood disorders) compared to employees without the focal condition. β_2 is the marginal change for employees with any conditions besides the focal condition, and β_3 captures the marginal changes for the interactions between the focal and other conditions. $\sum \beta_k$ represents the marginal changes for the demographic variables included in the models. These demographics include sex, age, race (white, black, or any other), and Hispanic ethnicity. The models are run separately for each industry. For the estimates of the U.S. workforce, indicator variables for each industry are included.

The estimator is ordinary least squares regression for healthcare treatment costs and negative binomial regression for illness absences. To estimate either costs or absences for the baseline case (that is, for employees without the focal condition), the equation is solved at the mean of all variables in the model, with the values of focal condition and the interaction with the focal conditions set to zero. Excess costs or absences are calculated as β_1 plus the product of β_3 and the proportion of the population with any other chronic conditions (converted to the predicted number of events in the case of absences). All results are weighted to reflect the U.S. workforce.



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 1,200 member companies representing over 20 million workers.

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

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Integrated Benefits Institute
595 Market Street, Suite 810
San Francisco, CA 94105
tel. 415 222 7280
fax. 415 222 7281
info@ibiweb.org
ibiweb.org