INTEGRATED BENEFITS INSTITUTE

Health and Productivity Impact of Chronic Conditions

Back Pain

July 2017

Contents

Executive Summary: Health and Productivity Impact of Back Pain

- Of a nationally representative sample of employed U.S. adults, 11% had treatments for back pain (ICD-9 diagnosis codes 720.xx–724.xx).

- Excess medical and pharmacy treatment costs for employees with back pain averaged about $2,300 per year.

- Employees with back pain had an average of 2.5 excess sick days per year, at a cost of almost $700 in wages and benefits.

- Each year, employers' short-term disability (STD) insurance policies experience an average of 4.3 new claims for back pain per 1,000 covered lives. STD claims for back pain incur an average of 50 lost workdays, at an average cost of about $10,000 in wage replacements and paid employee benefits.

- Each year, employers' long-term disability (LTD) insurance policies manage an average of 2.7 active claims for back pain per 1,000 covered lives. Of LTD claims for back pain, 30% remain open two years after they begin. LTD claims for back pain incur an average of 169 lost workdays per year that they remain open, at an average cost of about $35,000 in wage replacements and paid employee benefits per year.

- Overall, for every 1,000 U.S. employees, back pain in the workforce costs about $444,000 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 back pain).

- Considerable cost differences are observed across industries, ranging from about $207,000 per 1,000 employees in leisure and hospitality to about $702,000 per 1,000 employees in transportation and utilities.

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.

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[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	• Agriculture, forestry, fishing and hunting • Mining, quarrying, and oil and gas extraction
Construction	• Construction
Manufacturing	• Manufacturing
Wholesale and retail trade	• Wholesale trade • Retail trade
Transportation and utilities	• Transportation and warehousing • Utilities
Information	• Information
Financial activities	• 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	• Professional, scientific and technical services • Management of companies and enterprises • Administrative and support and waste Management and remediation services
Education, health and social services	• Educational services • Healthcare and social assistance
Leisure and hospitality	• Arts, entertainment and recreation • Accommodation and food services
Other services	• Other services (except public administration)
Public administration	• Public administration

Back Pain

Introduction

For the purpose of this report, back pain is indicated as diagnoses for treatment or benefits with ICD-9 codes 720.xx—724.xx. Common diagnoses include intervertebral disc disorders and ankylosing spondylitis.

Prevalence

How many employees have back pain?

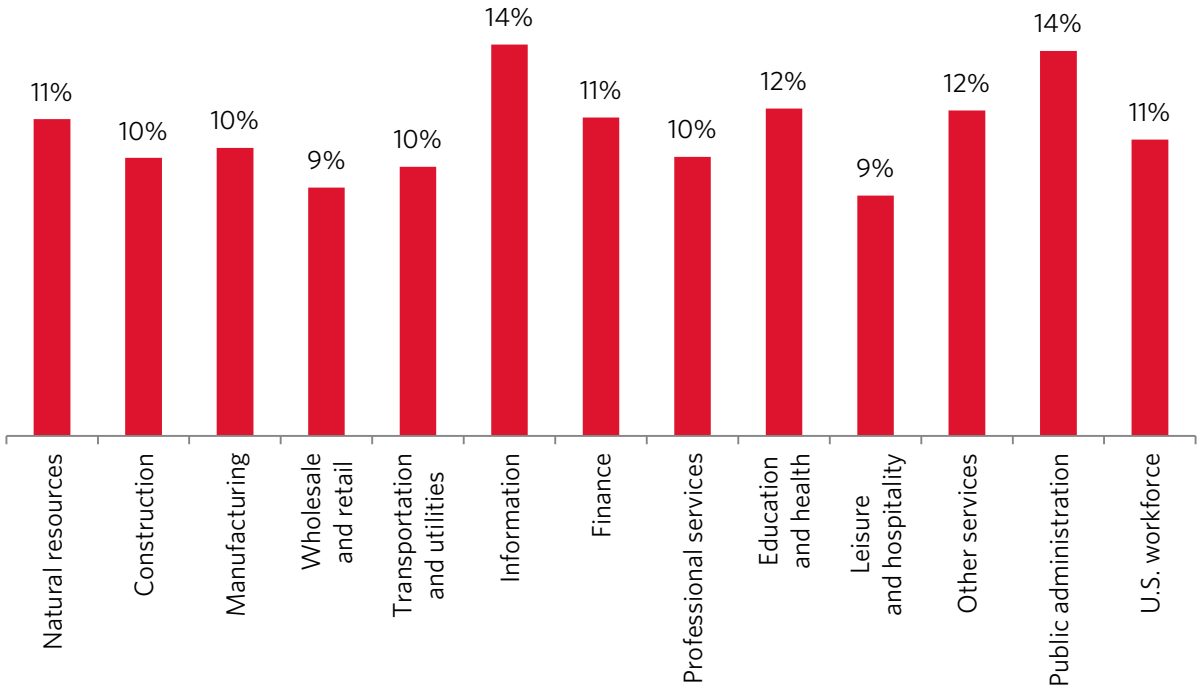

Figure 1

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

WHAT OTHER CONDITIONS (COMORBIDITIES) AFFLICT EMPLOYEES WITH BACK PAIN?

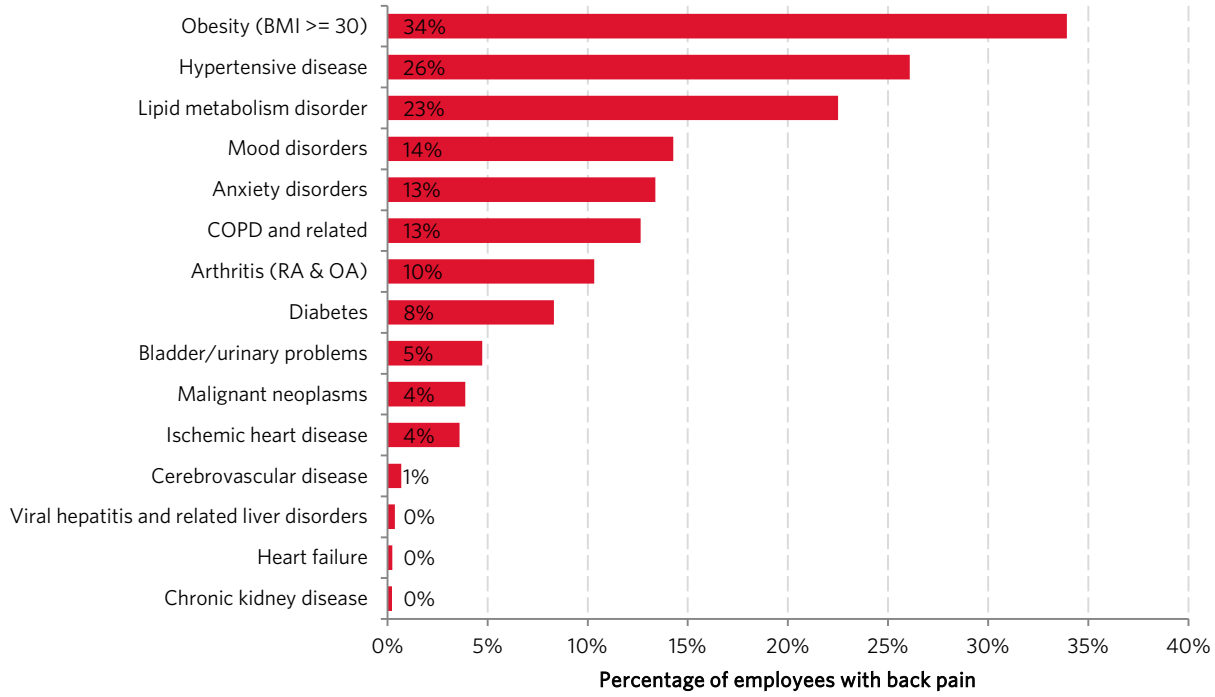

Figure 2

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 BACK PAIN?

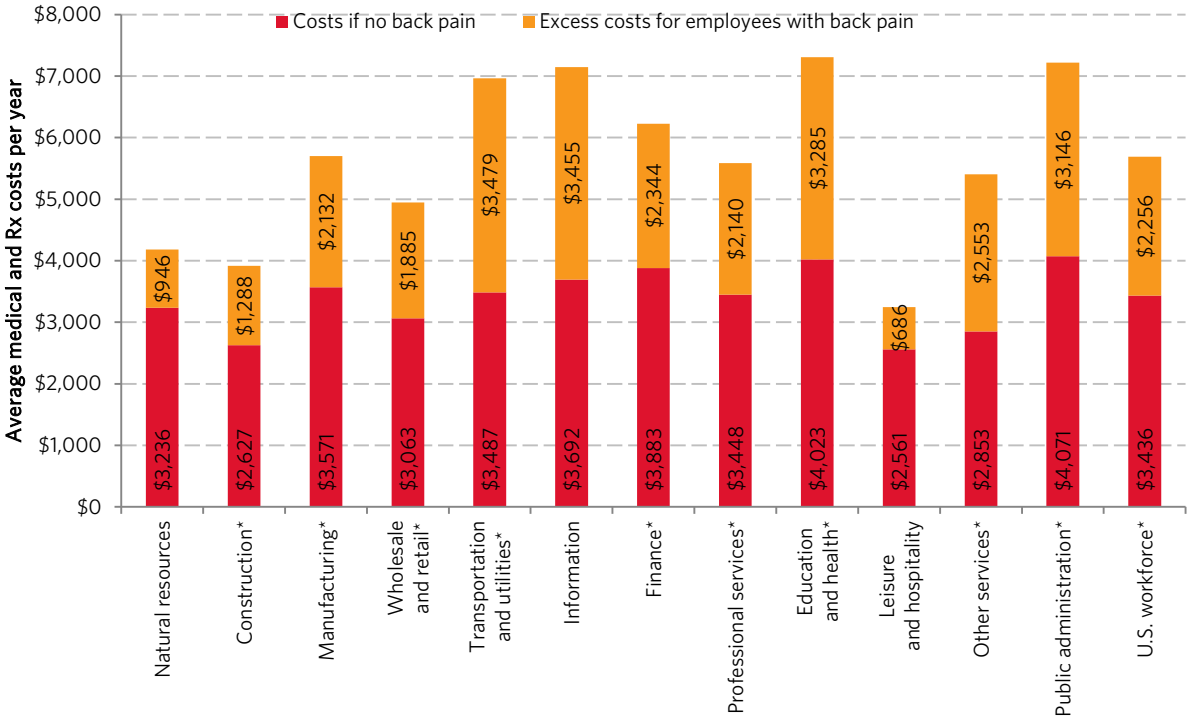

Figure 3

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 back pain 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 BACK PAIN ABSENT FROM WORK DUE TO ILLNESS?

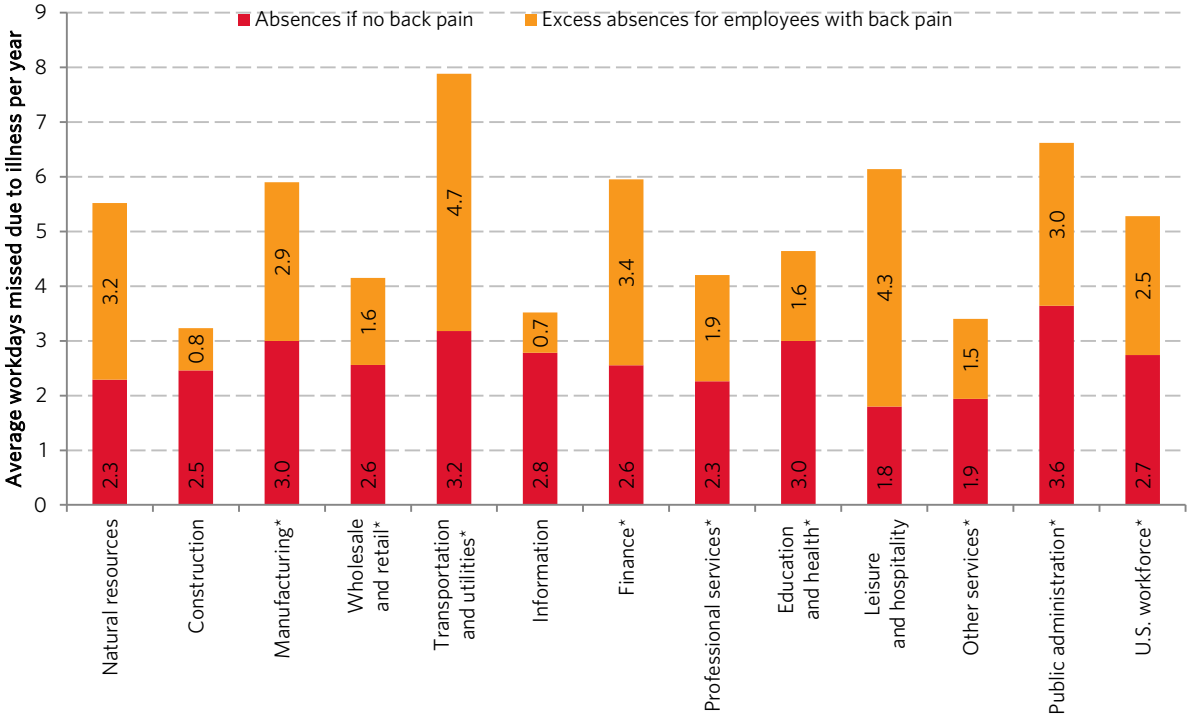

Figure 4

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 back pain 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 BACK PAIN?

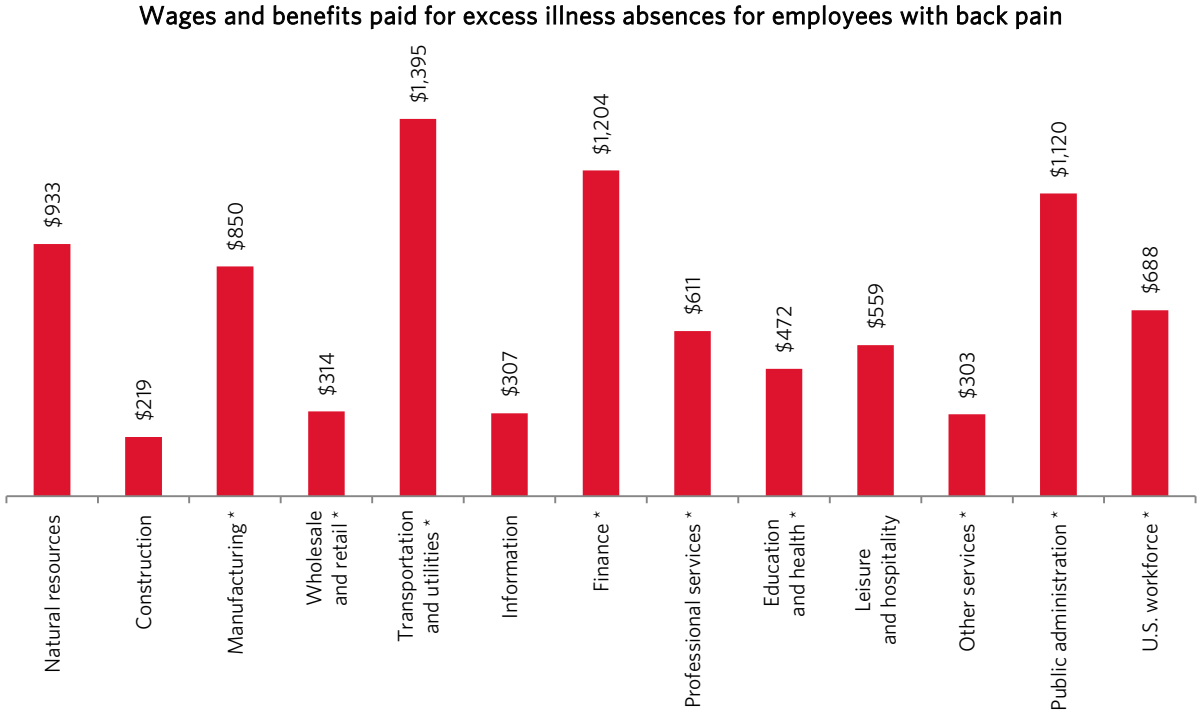

Figure 5

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 BACK PAIN?

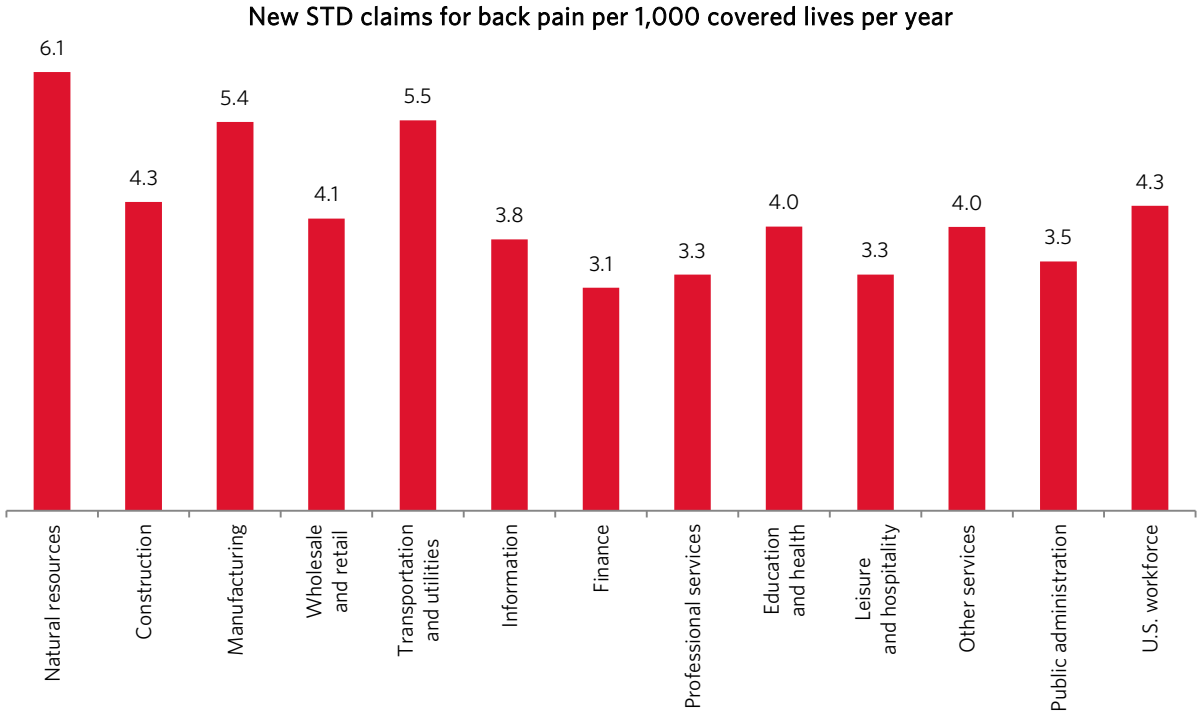

Figure 6

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

How long is the average STD claimant for back pain away from work?

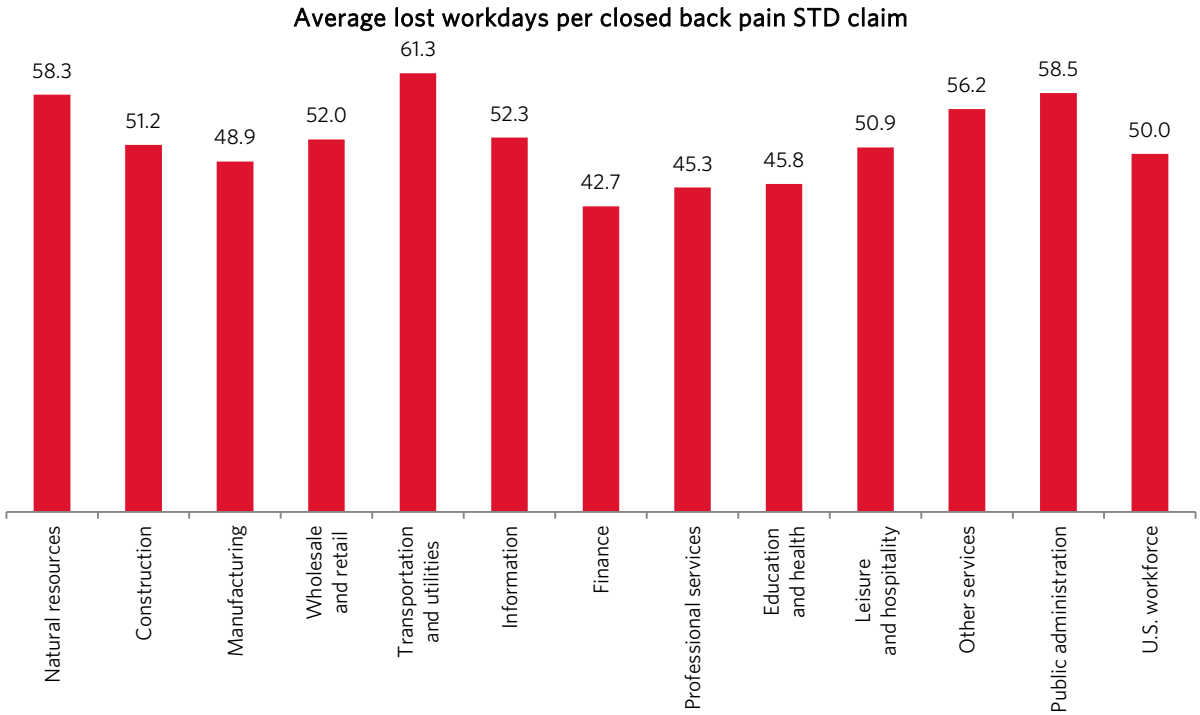

Figure 7

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

How much does the average STD claim for back pain cost?

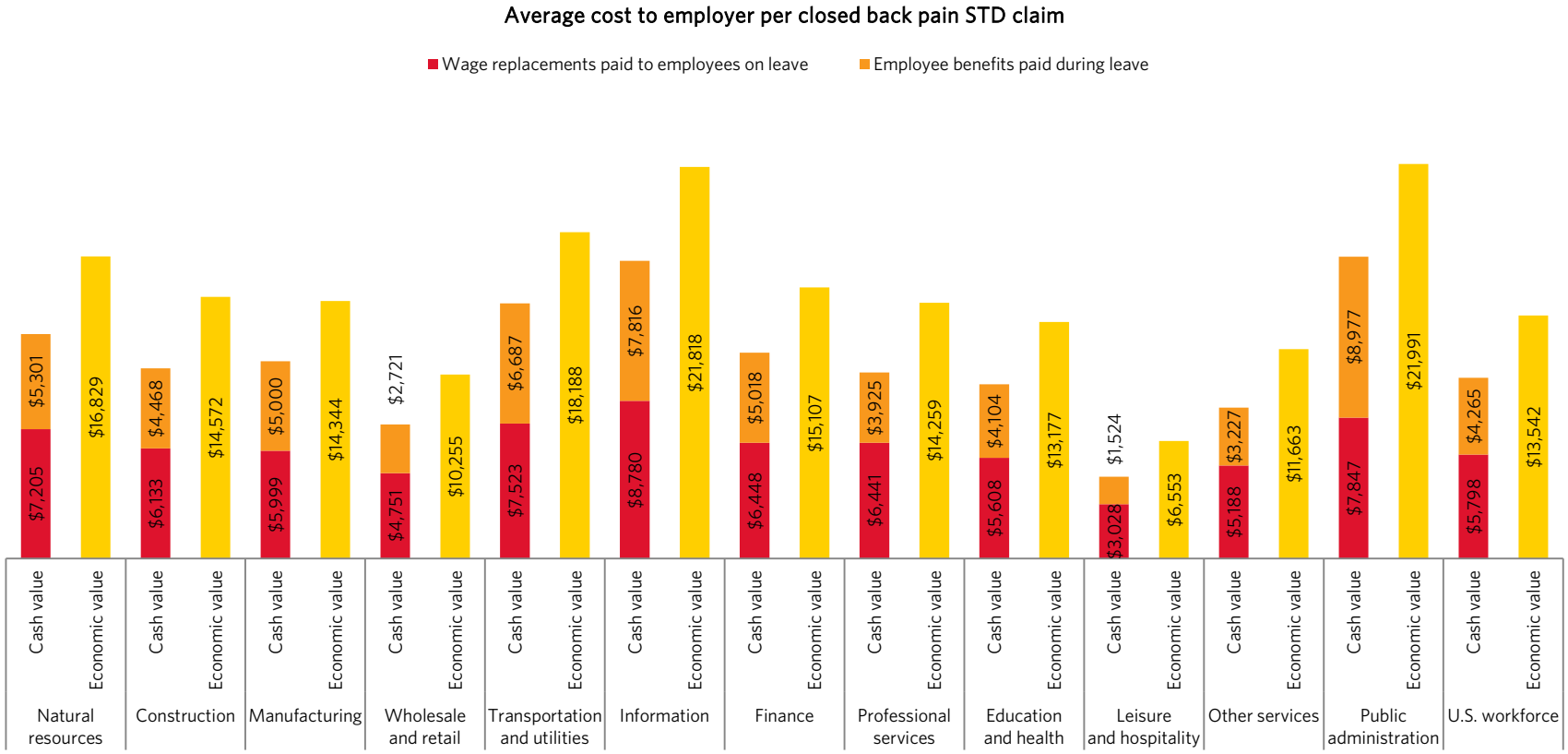

Figure 8

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 back pain over a given year?

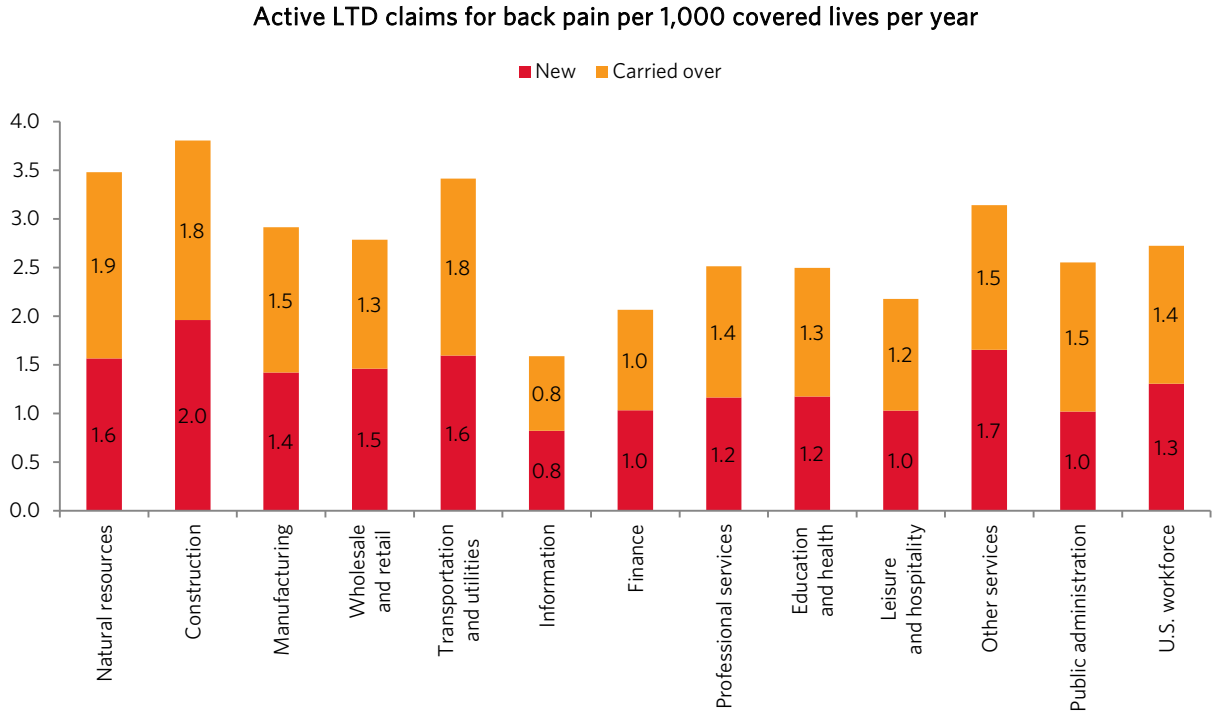

Figure 9

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?

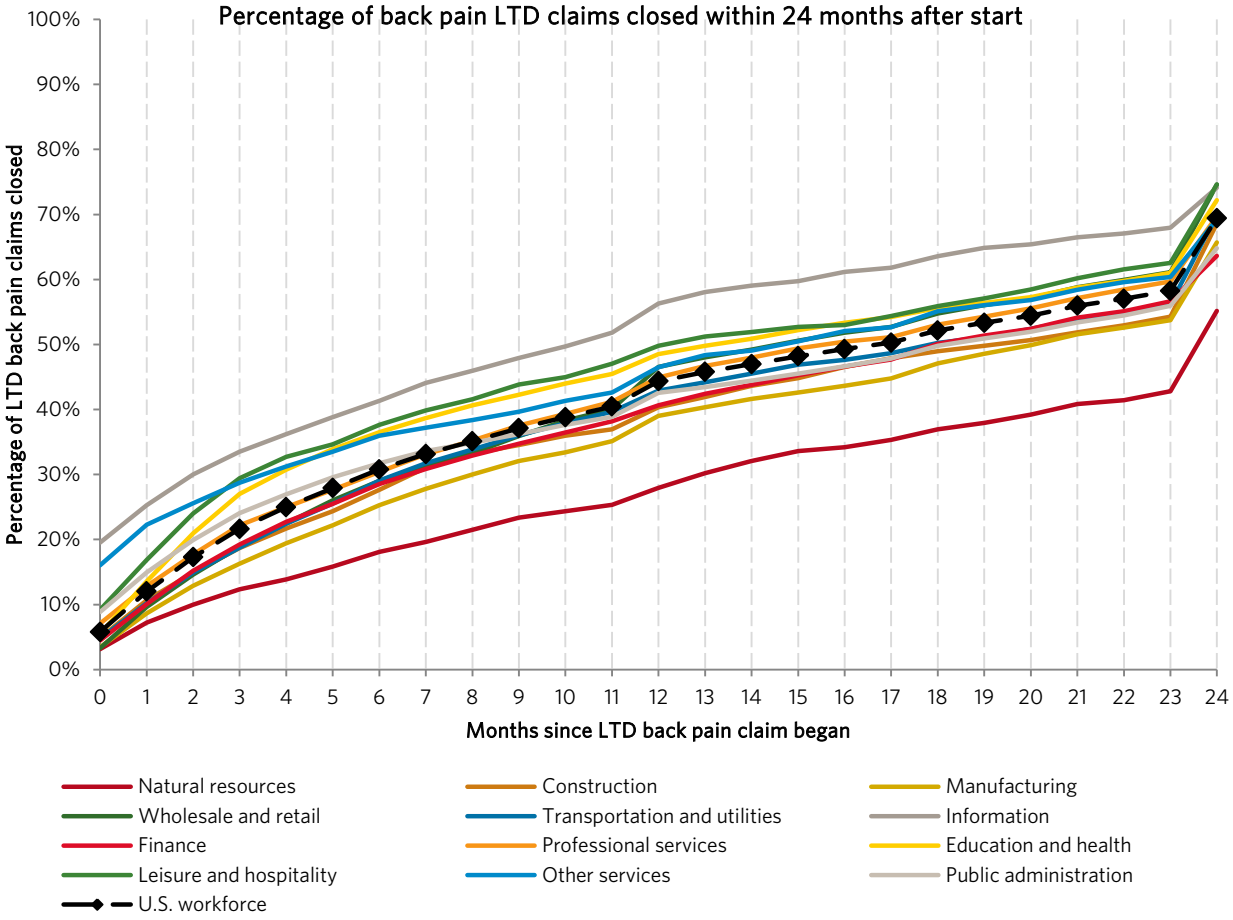

Figure 10

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 back pain?

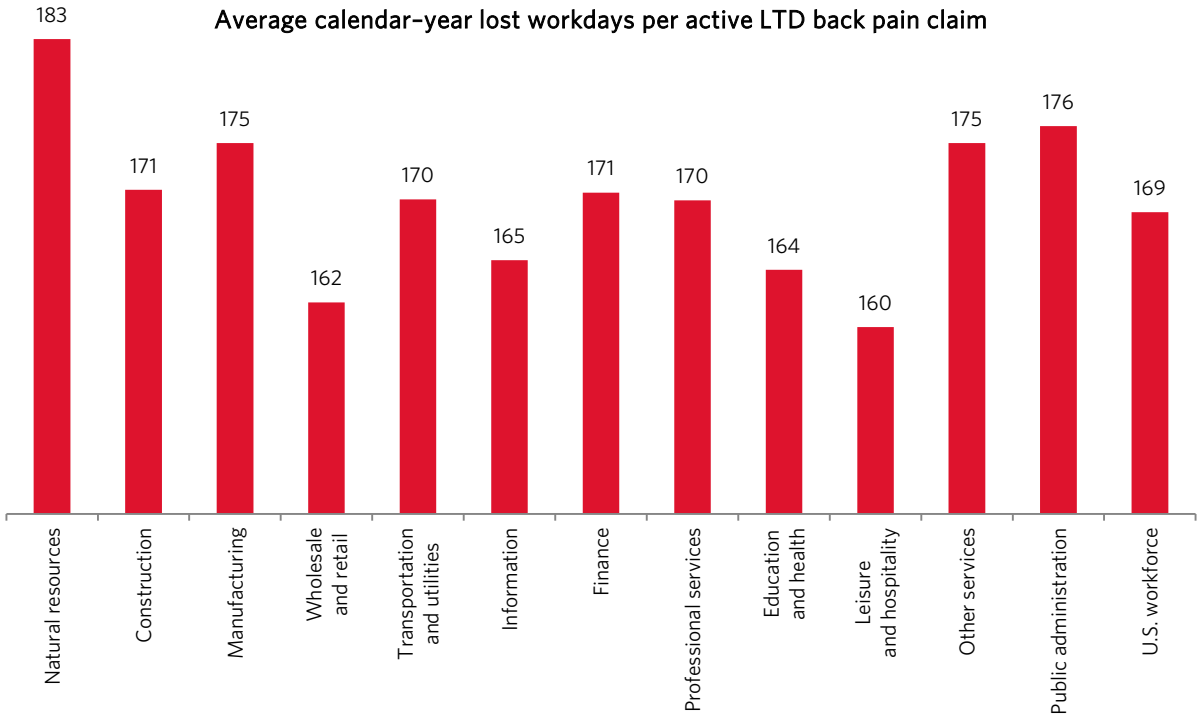

Figure 11

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 back pain cost each year?

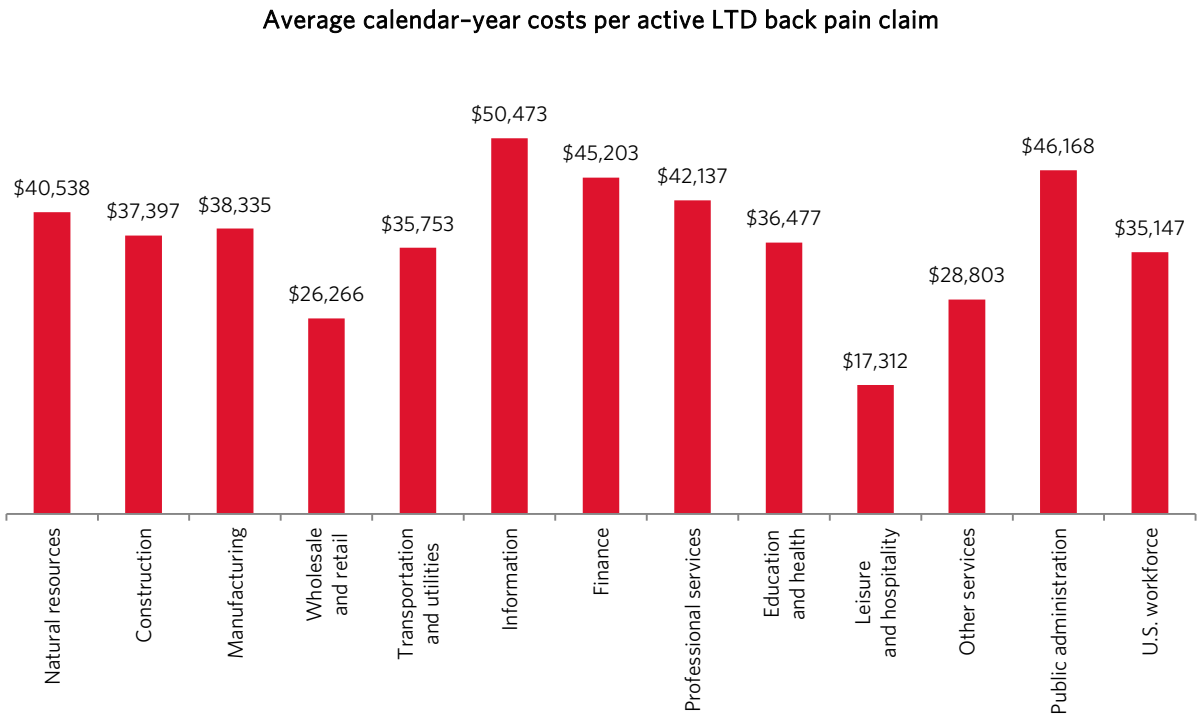

Figure 12

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

Total Costs of Back Pain in a Workforce

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

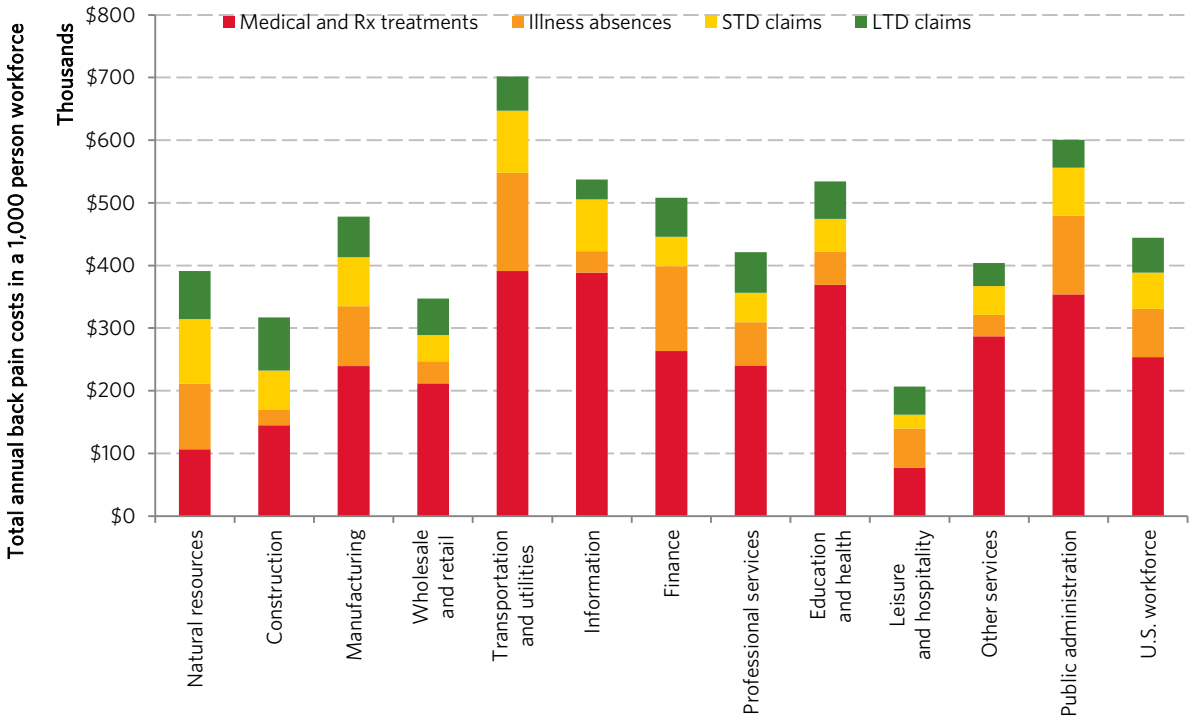

Figure 13

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 back pain and the average excess outcomes for employees with back pain (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 back pain. 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 back pain in a 1,000-person workforce

	Medical and Rx treatments	Illness absences	STD claims	LTD claims	Total
Natural resources	$106,315	$104,876	$103,128	$76,982	$391,301
Construction	$144,771	$24,612	$62,842	$84,735	$316,960
Manufacturing	$239,637	$95,528	$77,887	$65,018	$478,070
Wholesale and retail	$211,874	$35,246	$41,836	$58,161	$347,118
Transportation and utilities	$391,040	$156,787	$99,197	$54,880	$701,904
Information	$388,342	$34,535	$82,664	$31,527	$537,068
Finance	$263,466	$135,339	$47,017	$62,055	$507,878
Professional services	$240,536	$68,651	$46,990	$65,076	$421,252
Education and health	$369,234	$53,013	$52,288	$59,386	$533,921
Leisure and hospitality	$77,106	$62,793	$21,619	$45,211	$206,729
Other services	$286,957	$34,027	$46,206	$36,468	$403,657
Public administration	$353,610	$125,873	$76,527	$44,732	$600,743
U.S. workforce	$253,574	$77,351	$57,677	$55,669	$444,271

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 back pain and the average excess outcomes for employees with back pain (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 back pain. 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

Fortunately, most back pain can be treated non-surgically with medications and physical therapy, and episodes of pain can be prevented with attention to proper techniques for sitting, working and exercising. Employers stand to benefit from understanding the extent of back pain in their workforce and helping employees prevent, treat and manage their pain.

Several sources are good starting points for crafting strategies to manage the full costs of back conditions:

- Occupational therapy has been shown in a number of studies to reduce the duration of temporary disability from work for back pain.[5]

- Research indicates that employees with positive expectations about their recovery from acute back pain had shorter work absence durations than employees with negative expectations.[6] In addition to somatic therapies and ergonomic interventions, back pain sufferers may also benefit from counseling and mental health interventions.

- Multidisciplinary interventions have proven effective in reducing long-term sickness absence from work.[7] Therapies limited to single healthcare disciplines were not as effective as those involving two or more.

- Most cases of low back pain can resolve in a relatively short time, using low-cost workplace-based interventions such as job accommodation.[8] If the prognosis for return to work is already good, structured interventions are unlikely to have an added impact until eight to 12 weeks. Assuming that all interventions offered are high quality, a cost-effective strategy is to use a stepped approach to treatment, beginning with workplace-based interventions and followed by more-structured medical and vocational rehabilitation interventions.

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[5] See, for example, Lambeek LC, van Mechelen W, Knol DL, Loisel P, Anema JR. Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life. *British Medical Journal.* 2010;340:c1035; Jousset N, Fanello S, Bontoux L et al. Effects of functional restoration versus 3 hours per week physical therapy: A randomized controlled study. *Spine.* 2004;29(5):487-93; and Joy JM, Lowy J, Mansoor JK. Increased pain tolerance as an indicator of return to work in low-back injuries after work hardening. *American Journal of Occupational Therapy.* 2001;55(2):200-205.

[6] Hallegraeff JM, Krijnen WP, van der Schans CP, de Greef MH. Expectations about recovery from acute non-specific low back pain predict absence from usual work due to chronic low back pain: A systematic review. *Journal of Physiotherapy.* 2012;58(3):165-72.

[7] Norlund A, Ropponen A, Alexanderson K. Multidisciplinary interventions: Review of studies of return to work after rehabilitation for low back pain. *Journal of Rehabilitation Medicine.* 2009;41(3):115-21.

[8] Van Duijn M, Eijkemans MJ, Koes BW, Koopmanschap MA, Burton KA, Burdorf A. The effects of timing on the cost-effectiveness of interventions for workers on sick leave due to low back pain. *Occupational and Environmental Medicine.* 2010;67(11):744-50.

Additional Information About Back Pain

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

National Institute of Neurological Disorders and Stroke: Low Back Pain Fact Sheet

Centers for Disease Control and Prevention: Ergonomics and Musculoskeletal Disorders

American Chronic Pain Association: Practice Guidelines for Low Back Pain

INTEGRATED BENEFITS INSTITUTE

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.

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