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## Prevalence, Recognition of Work-Relatedness, and Impact on Work of Low Back Pain among U.S. Workers

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### Abstract

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### Background

The employment of patients with back pain has implications for both the factors causing or contributing to the pain and the impacts of the pain, but few estimates of the proportion of back pain that is related to work in the United States are available (1). In 2015, the National Health Interview Survey (NHIS) collected supplemental data about the work-relatedness and work impacts of back pain—specifically, low back pain (LBP)—among U.S. workers for the first time since 1988.

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Reproducible Research Statements

Protocol: National Center for Health Statistics' Ethics Review Board Protocol #2015-08

Statistical Code: Available to interested readers by contacting Dr. Dahlhamer at [jdahlhamer@cdc.gov](mailto:jdahlhamer@cdc.gov)

Data: Available online at [https://www.cdc.gov/nchs/nhis/nhis\\_2015\\_data\\_release.htm](https://www.cdc.gov/nchs/nhis/nhis_2015_data_release.htm).

## Objective

The objective of this study was to estimate the burden of LBP among U.S. workers, its work-relatedness, and its impact on work.

## Methods and Findings

The NHIS is a nationally-representative health survey (2). This study is limited to the 19,441 randomly-selected sample adults who were employed during the week prior to interview (i.e., workers) and answered an initial question about LBP and supplemental items on LBP and work. Former workers were excluded. Survey items from NHIS that were used to define LBP, job characteristics, and impacts of LBP on ability to work are presented in the Supplement. The final response rate of the 2015 NHIS Sample Adult component was 55.2%

The overall prevalence of any LBP was 26.4%, frequent and severe LBP was 8.1%, and LBP attributed to work was 5.6% (Table 1). The prevalence of all three LBP outcomes was lowest among workers employed in Computer and Mathematical Occupations. The prevalence of any LBP and LBP attributed to work was highest in Construction and Extraction Occupations, while the prevalence of frequent and severe LBP was highest in Building and Grounds Cleaning and Maintenance Occupations. Workers who reported frequent exertion or frequent standing were more likely than those who did not to report all three LBP outcomes.

Approximately 21.4% of workers with any LBP and 23.7% of workers with frequent and severe LBP reported being told by a health professional that their LBP was probably work-related (Table 2). However, most workers with LBP did not recall ever discussing with a health professional whether their LBP was probably work-related. Overall, 6.0% of current workers with any LBP, 10.2% of workers with frequent and severe LBP, and 18.4% of workers with LBP attributed to work by a health professional had ever filed a workers' compensation claim.

Regardless of the cause of LBP, 16.9% of workers with any LBP and 19.0% of workers with frequent and severe LBP missed at least one full day of work in the past three months because of LBP. Furthermore, 6.1% of workers with any LBP and 10.7% of workers with frequent and severe LBP had stopped working, changed jobs, or made a major change in work activities in the past three months because of their LBP. The proportions of workers with LBP attributable to work that missed work (20.1%) or changed jobs or activities (11.0%) were only slightly higher than the proportions of all workers with frequent and severe LBP.

## Discussion

We found that in 2015 the three-month prevalence of any LBP among U.S. workers was approximately 26.4%, representing almost 40 million workers. Many of these cases were attributed to work by a healthcare professional, but most affected workers did not discuss work-relatedness with their providers. We also found that LBP had impacted many current workers' ability to work. However, our study may greatly underestimate the total

occupational impact of LBP in the population due to the short recall period and exclusion of former workers, some of whom may have left the workforce because of work-related LBP.

This study has several limitations. First, the data are cross-sectional. Second, the accuracy and reliability of assessing occupational causality of health conditions through respondent-report are unknown. Third, relying on reported attribution of LBP to work by a health professional likely underestimates work-relatedness. The main strength of this study is its large, nationally-representative sample of U.S. workers.

LBP has been linked to both physical and psychosocial occupational factors in many studies (3, 4). Diagnosing an occupational etiology may improve the chances of a patient's recovery if an occupational exposure precipitating the pain can be reduced or eliminated, and may allow the patient to apply for workers' compensation to cover medical costs and any lost wages (5).

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

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**Disclaimer:** The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health or the National Center for Health Statistics.

## References

1. Luckhaupt SE, Calvert GM. Work-relatedness of selected chronic medical conditions and workers' compensation utilization: National Health Interview Survey Occupational Health Supplement data. *Am J Ind Med.* 2010;53(12):1252–1263. [PubMed: 20721967]
2. National Center for Health Statistics. 2015 National Health Interview Survey (NHIS) Public Use Data Release: Survey Description. Hyattsville, MD: National Center for Health Statistics; 2016.
3. Musculoskeletal Disorders and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back, DHHS (NIOSH) Publication Number 97–141
4. Occupational and Environmental Health Recognizing and Preventing Disease and Injury Sixth Edition Edited by Levy Barry S., Wegman David H., Baron Sherry L., Sokas Rosemary K.. Copyright © 2011 by Oxford University Press, Inc. New York, NY.
5. Gill TK, Tucker GR, Avery JC, Shanahan EM, Menz HB, Taylor AW, Adams RJ, Hill CL. The use of self-report questions to examine the prevalence of musculoskeletal problems: a test-retest study. *BMC Musculoskeletal Disorders.* 2016;17:100 [PubMed: 26911879]

**Table 1.**

Prevalence of Any Low Back Pain, Frequent and Severe Low Back Pain, and Low Back Pain Attributed to Work in the Past Three Months in the U.S. Working Population, by Demographic and Job Characteristics

	Total Workers	Any Low Back Pain		Frequent & Severe Low Back Pain		Any Low Back Pain Attributed to Work by Health Professional	
		n	Weighted Prevalence (95% CI)	n	Weighted Prevalence (95% CI)	n	Weighted Prevalence (95% CI)
<b>All Workers</b>	19,441	5,272	26.4% (25.5-27.3%)	1,652	8.1% (7.6-8.6%)	1,205	5.6% (5.2-6.1%)
<b>Sex</b>							
Men	9,661	2,533	25.6% (24.5-26.8%)	747	7.5% (6.8-8.2%)	684	6.4% (5.7-7.1%)
Women	9,780	2,739	27.3% (26.1-28.5%)	905	8.8% (8.0-9.6%)	521	4.8% (4.3-5.4%)
<b>Age (yrs.)</b>							
18-29	3,987	878	20.5% (18.8-22.3%)	254	5.8% (4.8-6.9%)	161	3.8% (3.1-4.7%)
30-44	6,511	1,722	25.5% (24.2-26.9%)	527	7.8% (6.9-8.7%)	377	5.3% (4.6-6.1%)
45-64	7,609	2,281	30.3% (28.9-31.7%)	742	9.6% (8.7-10.5%)	601	7.3% (6.5-8.1%)
65	1,334	391	29.2% (25.8-32.7%)	129	8.6% (6.8-10.7%)	66	3.8% (2.7-5.2%)
<b>Race and ethnicity</b>							
Non-Hispanic white	12,131	3,490	28.0% (26.9-29.1%)	1,136	8.8% (8.1-9.5%)	727	5.3% (4.7-5.9%)
Non-Hispanic black	2,446	630	24.5% (22.3-26.8%)	181	6.9% (5.7-8.2%)	156	6.3% (5.1-7.7%)
Non-Hispanic other race	1,451	292	18.8% (16.1-21.8%)	77	4.6% (3.3-6.2%)	79	5.2% (3.7-7.0%)
Hispanic	3,413	860	24.7% (22.8-26.7%)	258	7.5% (6.4-8.7%)	243	6.7% (5.6-8.0%)
<b>Occupational category*</b>							
Management	1910	473	25.4% (22.7-28.2%)	124	6.9% (5.4-8.7%)	89	4.2% (3.0-5.5%)
Business and Financial Operations	979	224	25.4% (21.4-29.7%)	48	6.1% (4.2-8.5%)	39	4.5% (3.0-6.5%)
Computer and Mathematical	627	117	17.2% (13.8-21.1%)	31	4.6% (2.7-7.2%)	17	2.8% (1.5-4.7%)
Architecture and Engineering	370	80	23.8% (18.1-30.3%)	†	†	8	2.1% (0.7-4.6%)
Life, Physical, and Social Science	229	63	26.0% (18.1-35.3%)	†	†	†	†
Community and Social Services	428	119	24.5% (18.7-31.0%)	39	6.2% (3.6-9.9%)	†	†
Legal	247	59	26.3% (19.1-34.6%)	†	†	†	†

	Total Workers		Any Low Back Pain		Frequent & Severe Low Back Pain		Any Low Back Pain Attributed to Work by Health Professional	
	n	Weighted Prevalence (95% CI)	n	Weighted Prevalence (95% CI)	n	Weighted Prevalence (95% CI)	n	Weighted Prevalence (95% CI)
Education, Training, and Library	1279	24.8% (21.5-28.4%)	302	24.8% (21.5-28.4%)	85	5.7% (4.1-7.7%)	43	3.4% (2.2-5.0%)
Arts, Design, Entertainment, Sports	418	23.6% (18.6-29.2%)	106	23.6% (18.6-29.2%)	27	4.9% (2.7-8.1%)	22	6.0% (3.3-9.9%)
Healthcare Practitioners and Technical	1117	29.4% (26.0-33.0%)	338	29.4% (26.0-33.0%)	92	7.5% (5.8-9.6%)	75	6.6% (4.7-8.9%)
Healthcare Support	493	27.7% (22.5-33.4%)	145	27.7% (22.5-33.4%)	58	10.8% (7.4-15.1%)	45	7.9% (5.1-11.6%)
Protective Service	353	25.8% (19.8-32.5%)	103	25.8% (19.8-32.5%)	31	6.6% (4.1-10.0%)	36	8.3% (5.0-12.8%)
Food Preparation and Serving	999	25.3% (21.4-29.5%)	284	25.3% (21.4-29.5%)	91	8.2% (6.1-10.7%)	74	4.9% (3.5-6.6%)
Building and Grounds Cleaning & Maintenance	843	30.3% (26.2-34.6%)	265	30.3% (26.2-34.6%)	98	11.4% (8.7-14.6%)	83	7.6% (5.4-10.3%)
Personal Care and Service	675	30.0% (25.4-35.0%)	206	30.0% (25.4-35.0%)	79	9.9% (7.3-13.0%)	50	9.1% (5.9-13.2%)
Sales and Related	1786	24.3% (21.7-27.0%)	470	24.3% (21.7-27.0%)	168	8.5% (6.9-10.3%)	91	4.2% (3.1-5.6%)
Office and Administrative Support	2369	29.1% (26.6-31.7%)	679	29.1% (26.6-31.7%)	226	9.8% (8.2-11.6%)	112	4.8% (3.7-6.2%)
Farming, Fishing, and Forestry	179	17.8% (10.8-26.8%)	33	17.8% (10.8-26.8%)	<sup>†</sup>	<sup>†</sup>	10	2.6% (0.9-5.7%)
Construction and Extraction	960	31.6% (27.5-35.9%)	312	31.6% (27.5-35.9%)	99	9.9% (7.5-12.8%)	121	12.3% (9.3-15.8%)
Installation, Maintenance, and Repair	616	29.9% (25.1-35.1%)	192	29.9% (25.1-35.1%)	69	10.4% (7.2-14.3%)	60	8.8% (6.0-12.3%)
Production	1171	26.3% (22.9-29.9%)	329	26.3% (22.9-29.9%)	111	10.5% (7.9-13.6%)	79	5.8% (4.2-7.7%)
Transportation and Material Moving	1063	29.3% (25.6-33.2%)	319	29.3% (25.6-33.2%)	106	9.0% (6.9-11.4%)	113	9.1% (7.0-11.6%)
<b>Frequent Exertion at Work</b>								
Yes	8056	32.1% (30.7-33.6%)	2661	32.1% (30.7-33.6%)	926	11.1% (10.2-12.0%)	798	8.9% (8.0-9.8%)
No	11360	22.4% (21.3-23.5%)	2604	22.4% (21.3-23.5%)	723	5.9% (5.3-6.5%)	405	3.3% (2.9-3.8%)
<b>Frequent Standing at Work</b>								
Yes	12919	27.9% (26.8-29.0%)	3746	27.9% (26.8-29.0%)	1230	8.9% (8.2-9.6%)	959	6.6% (6.0-7.2%)
No	6498	23.5% (22.1-25.0%)	1521	23.5% (22.1-25.0%)	419	6.5% (5.7-7.4%)	244	3.7% (3.2-4.3%)

Data: National Health Interview Survey (NHIS), 2015; NHIS items on LBP and its relatedness to work are presented in the Supplement. Analyses were performed using SAS-callable SUDAAN software version 11.0, and weighted using final NHIS sample adult weights to achieve national representation.

Abbreviations: n=sample size, CI= Korn-Graubard 95% Confidence Interval

\* Results are not reported for the military-specific occupational group because the NHIS sample is based on the civilian population.

<sup>†</sup> Estimate does not meet standards of precision.

**Table 2.** Recognition of Work-relatedness and Impact on Work among Employed U.S. Adults with Low Back Pain

	Any Low Back Pain (n=5,272) <sup>*</sup>		Frequent & Severe Low Back Pain (n=1,652) <sup>*</sup>		Any Low Back Pain Attributed to Work by Health Professional (n=1,205) <sup>*</sup>	
	n	Weighted Proportion (95% CI)	n	Weighted Proportion (95% CI)	n	Weighted Proportion (95% CI)
<b>Recognition of work-relatedness</b>						
Told by health professional that LBP was probably work-related	1,205	21.4% (19.8-23.1%)	446	23.7% (21.0-26.5%)		
Ever discussed with a health professional whether LBP was probably work-related, but not told LBP was work-related	400	7.9% (6.9-8.9%)	154	10.3% (8.3-12.6%)		
Never discussed with a health professional whether LBP was probably work-related	3,646	70.7% (68.9-72.4%)	1,042	66.0% (62.9-69.0%)		
<b>Workers' compensation</b>						
Ever filed a workers' compensation claim for LBP	349	6.0% (5.1-6.9%)	170	10.2% (8.3-12.4%)	236	18.4% (15.5-21.6%)
<b>Missed work</b>						
Missed 1 full day of work in past three months because of LBP	901	16.9% (15.5-18.3%)	327	19.0% (16.5-21.7%)	234	20.1% (17.1-23.4%)
<b>Changed jobs/activities</b>						
Stopped working, changed jobs, or made a major change in work activities in past three months because of LBP	321	6.1% (5.3-7.0%)	176	10.7% (8.7-12.9%)	135	11.0% (8.8-13.5%)

Data: National Health Interview Survey (NHIS), 2015; NHIS items on LBP and its relatedness to work are presented in the Supplement. Analyses were performed using

SAS-callable SUDAAN software version 11.0, and weighted using final NHIS sample adult weights to achieve national representation.

Abbreviations: n=sample size; CI= Korn-Graubard 95% Confidence Interval, LBP=low back pain

\* Row totals may not add up to the total sample size due to missing data for specific questions.