

# An Analysis of Low Back Pain Disorders in Workers Louisiana, 1998-2009

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## Background

Low Back Pain (LBP) disorders are one of the most commonly occurring musculoskeletal injuries in Louisiana; they are also one of the leading occupationally related conditions and are the most frequent reason for filing a workers' compensation claim. Work-related LBP disorders that require surgery are of public health importance, as this process can be invasive, requires rehabilitation and has an economical burden. The Louisiana Department of Health and Hospitals recently added LBP disorders to the list of occupational health indicators routinely tracked. This article examines surgical LBP disorders among the Louisiana workforce.

LBP disorders can be defined as chronic or acute pain of the lumbosacral, buttock or upper leg region occasionally with pain radiating from the back region down one or both legs. They include spinal disc problems such as hernias and spondylolisthesis, and muscle and soft tissue injuries. Recurrence of low back disorders is very high; once injured, the back is susceptible to re-injury, particularly if risk factors are not corrected. Factors due to poor ergonomics in the workplace contribute to low back disorders.

Several epidemiologic studies have revealed strong evidence of a positive association between LBP, heavy physical work and whole body vibration. Heavy physical work, including but not limited to jobs such as construction laborers, nurses and maids, has been defined as work that has high energy demands, heavy tiring tasks, manual materials handling tasks (lifting), or dynamic, intense work requiring some measure of physical strength. Whole body vibrations (forceful movements) affecting truck/bus drivers, helicopter pilots, crane or earth movers, refer to mechanical energy oscillations which are transferred to the body as a whole, usually through a supporting system such as a seat or platform. These two main risk factors impose large compressive and/or stretching forces on the spine.

Although surgeries are rarely done to treat LBP disorders, they can be performed for people with chronic pain, herniated discs, spinal stenosis or spondylolisthesis for which other treatment options have failed, and for people who have degenerative disc disease.

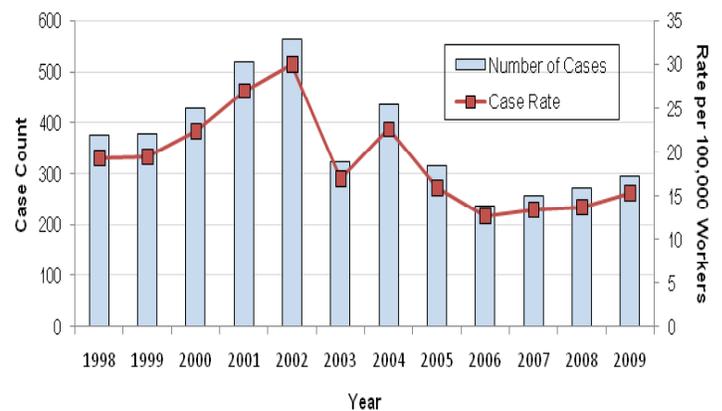
## Methods/Results

Louisiana Hospital Inpatient Discharge Data (LAHIDD) from the years 1998-2009 served as the data source for this analysis. Cases were selected if they were Louisiana residents at least 16 years old who were hospitalized with a relevant LBP diagnosis and LBP surgery code. Only work-related hospitalizations were included. Payment by workers' compensation was used as an indicator of work-relatedness.

Surgical hospitalizations accounted for 83% of all work-related LBP disorder hospitalizations among Louisiana workers (N=5,267). Linear regression was used to determine rate trends and a two tailed t-test to compare surgical rates stratified by gender. A p-value of 0.05 is considered statistically significant. Data was analyzed using SAS version 9.2.

From 1998 to 2009, there were 4,383 total surgical hospitalizations, or approximately 365 surgical cases in Louisiana each year. The surgical rate showed a significant decrease over the study period with a mean annual rate of 19.05 per 100,000 employed persons ranging from a high of 30.0 in 2002 to a low of 15.3 in 2006 (p=0.036) (Figure 1).

Figure 1: Case count and crude case rate of lower back disorder surgical hospitalizations - Louisiana, 1998-2009



The most common LBP disorder was herniated discs (65% of all diagnosis). Herniated discs occur when the hard outer coating of the discs that cushion the bones of the spine are damaged, allowing the discs' jelly-like center to leak and irritate nearby nerves (Table 1).

Table 1: Diagnosis categories - Louisiana, 1998-2009

Diagnostic Categories	N	Percent
Herniated Disc	2845	64.9
Probable Degenerative Changes	767	17.5
Spinal Stenosis	423	9.7
Possible Instability	241	5.5
Miscellaneous	107	2.4
<b>Total</b>	<b>4383</b>	<b>100</b>

'Fusions', a surgical technique to join two or more vertebrae to eliminate pain caused by abnormal motion, and 'discectomies', the surgical removal of a herniated disc that presses on a nerve root or the spinal cord, accounted for approximately 49% and 43% of all procedures, respectively (Table 2).

Table 2: Procedure categories - Louisiana, 1998-2009

Procedure Categories	N	Percent
Fusion	2126	48.5
Discectomy	1898	43.3
Laminectomy	322	7.3
Other	37	0.8
<b>Total</b>	<b>4383</b>	<b>100</b>

The mean age of surgical cases was 43 years (SD=10.1 range 19-79) with 65% of procedures occurring among individuals aged 35 to 54 years. Men had a higher rate of LBP disorders surgical hospitalizations than women (27.6 per 100,000 employed persons vs. 9.10 per 100,000 employed persons, respectively). The mean length of stay in the hospital was approximately three days (SD=2.09 range 0-31). However, women had a significantly higher mean length of stay than men (3.1 days versus 2.8 days, respectively) ( $p=0.0035$ ). The mean cost of LBP disorders was \$37,731 with women having a significantly higher cost burden than men (\$41,099 versus \$36,719, respectively) ( $p=0.002$ ).

## Discussion

Results indicate that the highest percentage of Louisiana's workforce that had surgeries for LBP disorders were middle-aged, and that herniated discs dominated the list of those disorders. These results are consistent with the literature that herniated discs are more common among middle-aged people as over time, these discs lose water content, become narrower and less flexible. Age, compounded with repetitive, incorrect lifting techniques and other strenuous occupational activities, exacerbate the natural degeneration of these discs. The elevated surgical LBP disorder rates among men compared with women may reflect differences in occupational patterns in Louisiana.

LBP disorders have high costs to society and the economic burden is primarily related to costs of losses in productivity. In 2008, the United States spent \$7.4 billion of direct and indirect costs (loss wages and productivity) related to back injuries and low back pain accounted for 818,000 disability-adjusted life years lost annually.

Several interventions have been developed to help prevent LBP disorders among workers in high risk occupations. For example, nurses and other healthcare workers experience serious back injuries during the handling and transferring of patients; therefore the use of mechanical lifting devices and repositioning aids can be effective. Studies have demonstrated that facilities implementing these interventions have shown a reduction of lifting-related injuries, days away from work and workers' compensation claims. In construction, ergonomic solutions such as the reduction of the

weight, size and shape of the load have been introduced. Using lifting devices and having job rotations are other methods to reduce the risk of low back injury. Interventions to address whole body vibrations are limited due to the nature of the machine. However, recommendations about implementing vibration limits that require oscillation acceleration of no more than 0.3-0.45 m/s<sup>2</sup> have been made. Oscillation speed can be decreased by jointly engineering the suspension of the vehicle's axles and the drivers' and passengers' seats.

## Conclusion

Although hospitalization data are useful for describing occupational injuries and illnesses, there are limitations. Occupation and industry information is not recorded on hospital data therefore proxy variables, such as patient's source of payment, are used to capture work-relatedness. In addition, not all work-related surgeries are captured in this analysis if sources of payment were used other than workers' compensation. Therefore, these results underestimate the total LBP disorder burden. In addition, national rates for comparison with Louisiana were not available. Low back pain disorders afflict many workers and can cause lifelong pain and disability. Changing workplace practices known to cause LBP disorders is an important first step in improving workers' safety and reducing these debilitating musculoskeletal injuries. More emphasis should be placed on implementing effective solutions into workplace wellness programs, such as broader education/ training approaches that encompass anatomy, biomechanics, lifting and materials handling techniques, and recognition and correction of workplace risks. A comprehensive approach will focus not only on the physical risk factors, but the individual and psychosocial factors as well. Health departments can assist in efforts to improve the health of workers by tracking and evaluating LBP disorders to identify high risk populations, occupations and industries.

For more information, please contact Ms. Lackovic at (504) 568-8160 or email to [michelle.lackovic@la.gov](mailto:michelle.lackovic@la.gov). For references and the full text of the article please go to [http://new.dhh.louisiana.gov/assets/oph/Center-EH/envepi/occ\\_health/Low\\_Back\\_Pain\\_Article\\_9192011.pdf](http://new.dhh.louisiana.gov/assets/oph/Center-EH/envepi/occ_health/Low_Back_Pain_Article_9192011.pdf).

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## Announcements

### Updates: Infectious Disease Epidemiology (IDES) Webpages

<http://www.infectiousdisease.dhh.louisiana.gov>

**ANNUAL REPORTS:** Amebiasis; Blastomycosis; Cyclosporiasis; Disease Listing by Year 1990-2010; Hepatitis A; Hepatitis B; Hepatitis C; Histoplasmosis; Influenza; Listeria; Meningococcal Infections; Respiratory Syncytial Virus (RSV); Rubella; Summary of Reportable Diseases 2009-2011; Tetanus; Trichinosis

**EPIDEMIOLOGY MANUAL:** Amebiasis; Free-living Ameba Case Report Form (CDC); Hepatitis A; Ice Machines and Ice; Ice Machine Sanitary Care Pamphlet; Scabies; Tick-Borne Relapsing Fever-Public Information; Water Bacteria

**HAI:** 2011 NHSN Training Binder; Fall, 2011 Newsletter; Long Term Acute Care Hospitals-Transmission; LTACH HAI Source; LTACH Isolations, Precautions; LTACH Elderly Common Infections; LTACH Elderly

Risk Factors; LTACH Infection Control Program; LTACH Surveillance and Definitions; LTACH Norvirus Summary; LTACH Norovirus Manual; LTCF MRSA Guidelines; LTACH UTI Prevention; CAUTI-HICPAC Guideline for Prevention-2009; LTACH Antimicrobial Use-SHEA 2000; MDRO Guideline 2006

**INFLUENZA:** Crisis Standards of Care Summary (CSOC); Limited Human-to-Human Transmission of Novel Influenza A (H3N2) Virus - Iowa, November 2011 (MMWR-CDC); Weekly Report

**LOUISIANA EARLY EVENT DETECTION SYSTEM:** LEEDS Explanation and Purpose

**SCHOOL RESOURCES:** School Manual

**VETERINARY:** Compendium of Animal Rabies Prevention and Control-2011 (CDC); Rabies Form (DHH); Use of a Reduced (4-Dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies-ACIP

**WEST NILE VIRUS:** Health Education Materials; Louisiana Arbovirus Surveillance Summary 2011; Repellent and Pesticides; Safe Handling Guidelines for Dead Birds