

# Asbestosis Hospitalizations Louisiana, 1999-2009

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## Background

Asbestosis is an important occupational health condition for Louisiana workers. The rate of hospitalizations with a diagnosis of asbestosis in Louisiana is significantly greater than the U.S. rate ( $p < 0.0001$ ). (The average rate of hospitalizations from 2000 to 2006 for Louisiana was 14.2 per 100,000 residents versus 7.7 per 100,000 residents for the United States.)

The objective of this paper is to describe the impact of asbestosis in Louisiana and to encourage physicians to obtain a comprehensive occupational and environmental history in order to identify people at risk from asbestos exposures. Asbestosis is a debilitating, chronic, lung disease with no known treatment that most commonly occurs among workers in certain occupational settings. As a condition highly associated with occupational exposure, its incidence has been affected by changes in industry standards. In particular, the ban on production and new uses of asbestos put in place during the past 20 to 30 years has significantly reduced occupational exposures. Despite these restrictions, asbestos can still be found in the construction, automotive, railroad and shipbuilding industries due to its favorable chemical properties. Various health outcomes are associated with asbestos exposure including asbestosis, pleural plaques and effusions, carcinomas and mesothelioma.

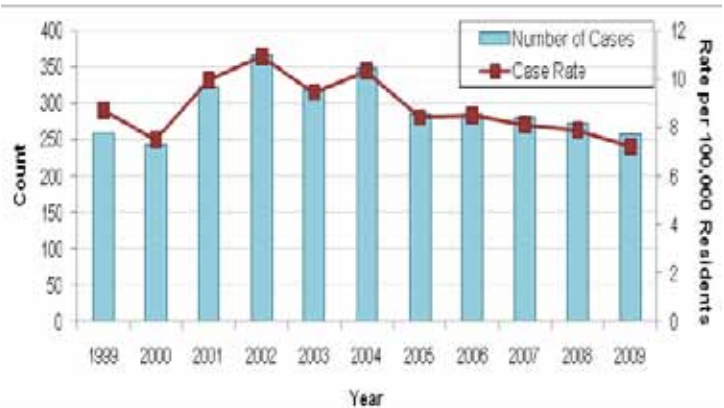
## Methodology

A retrospective review of asbestosis hospitalizations using Louisiana Hospital Inpatient Discharge Data (LAHIDD) from 1999 to 2009 was conducted. Records were selected if they had an ICD-9 diagnostic code of 501 (asbestosis) as either a primary or secondary diagnosis and were at least 16 years of age. Repeat admissions and patients who were not residents of Louisiana were excluded. Annual, age-standardized rates were calculated by dividing the total number of identified asbestosis hospitalizations by Louisiana's population aged 16 years and older for the same calendar year and standardized using the U.S. 2000 population figures. Population data was obtained from the U.S. Census Bureau. SAS 9.1 software was used to perform linear regression to determine trends of age-standardized rates of asbestosis hospitalizations; ANOVA (ANalysis Of Variance), and independent T-test were used to compare sex, age, race and geographical differences. A  $p < 0.05$  for a two-sided hypothesis testing was considered statistically significant.

## Results

During the 11-year study period, there were a total of 4,968 hospitalizations of individuals with an asbestosis diagnosis; after controlling for repeat admissions, there were 3,240 unique asbestosis hospitalizations resulting in approximately 295 cases per year (Figure 1).

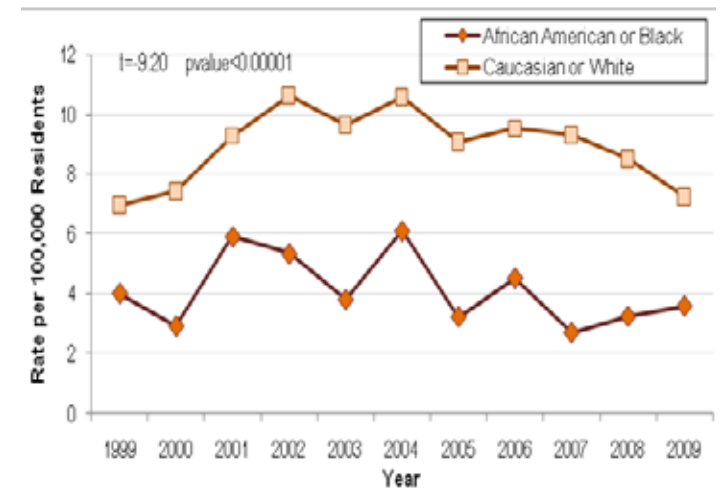
Figure 1: Case Count and Age Standardized Case Rate of Asbestosis Hospitalizations with Asbestosis - Louisiana, 1999-2009



The mean rate for the 11-year period was 8.8 per 100,000 residents (SD=1.19). The age-standardized incidence rate had minimal variation over the study period ranging from a high of 10.95 in 2002 to a low of 7.23 in 2009. Although there is a decreasing trend, it was not statistically significant ( $p=0.18$ ).

Information on race was available for 92% of cases. The 11-year mean age-standardized rates were consistently higher among Whites than Blacks with a mean of 8.93 hospitalizations per 100,000 residents compared to 4.13 hospitalizations per 100,000 residents, respectively. This difference was statistically significant ( $p < 0.00001$ ) (Figure 2).

Figure 2: Annual Age Standardized Case Rates of Asbestosis Hospitalizations by Race - Louisiana, 1999-2009

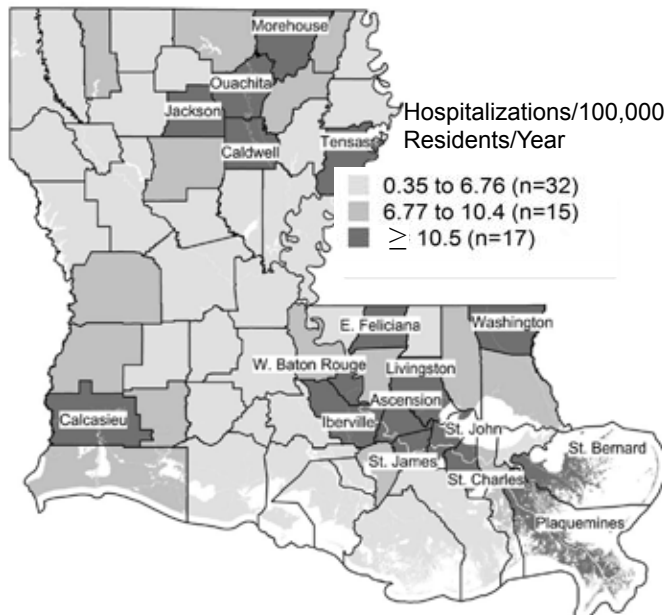


Males had significantly higher age standardized rates than females with a mean hospitalization rate of 20.56 per 100,000 residents compared to 0.69 per 100,000 residents, respectively; the difference was statistically significant ( $p < 0.00001$ ).

The mean age of asbestosis cases was 72 (SD=9.65 range 35-99) years and 79% of asbestosis cases occurred among individuals between 65 and 84 years old.

Parish rates were calculated from 2000 to 2009 as the parish level data was not available for 1999. Rates were calculated using the patient's parish of residence at the time of hospitalization (Figure 3).

Figure 3: Asbestosis Hospitalization Rate by Parish Louisiana, 2000-2009



The mean incidence rate for the state was 7.48 per 100,000 residents. In general, parishes with the highest hospitalization rates (>10.51 per 100,000 residents) are clustered in the northeast and within the industrial corridor (river parishes between New Orleans and Baton Rouge).

### Discussion

This is the first population-based analysis of asbestosis in Louisiana. Results indicate that Louisianians have consistently elevated rates of asbestosis in comparison with national rates, the number of Louisianians hospitalized with asbestosis has remained steady during the 11-year period.

The elevated case rate among males compared with females reflects gender differences in occupational patterns. Women's share of manual labor occupations remained unchanged between 1975 and 1995 at 24%, emphasizing that men accounted for the majority of employment in industries with the highest risk of asbestos exposure such as shipbuilding and construction.

Based on employment data in the construction and automotive industries from 1999 to 2009, males comprised approximately 74% of employees compared with 12% by females. These work patterns and resulting health outcomes are not unique to asbestos exposure. Overall, males have much greater work-related mortality and hospitalization rates. Recent studies of Louisiana workers found that males represent more than 90% of work-related mortalities and 75% of work-related hospitalizations.

The elevated rate among Whites compared with Blacks may also reflect employment patterns. Using data from the Current Population Survey, the rate of Whites employed in the construction industry from 1999 to 2009, was higher than the rate for Blacks ( $p < 0.0001$ ). (The average rate of Blacks employed in the construction industry from 2000 to 2009 was 7,381 per 100,000 employed population versus 10,277 per 100,000 employed population for Whites.)

Older residents had more asbestosis hospitalizations than younger ones due to the disease's long latency period of approximately 20 years. The development of the disease requires heavy exposure to asbestos, and the latency period is inversely proportional to exposure level.

The parishes that had incidence rates two to three times greater than the state average are parishes located in regions where ship yards, power plants, oil refineries and railroad industries are most abundant. Previous studies have shown that shipyards along the southern coast as well as southeast Louisiana extensively used asbestos as insulator for pipes and within the walls of ships. A risk of exposure to asbestos occurs during demolition and building of ships.

Power plants in east and south Louisiana contain pipes and boilers that are covered with asbestos fibers for thermal insulation purposes. These asbestos fibers can be disrupted and released into the air during routine checking and maintenance of the pipes and boilers.

Other sources of asbestos exposure are: railroads in north Louisiana; oil rigs and refineries in the Gulf of Mexico, and along the southern coast of Louisiana; construction industries throughout the state. Asbestos is released in these industries from the lining of brakes on trains during usage, the gripping of rings associated with brake systems in drilling equipment on oil rigs, the building and demolition of continuous walls enclosing oil rig platforms, and ceiling and floor tiles in homes and other buildings.

### Conclusions

Historic asbestos uses in Louisiana, such as ship-building, may have resulted in increased asbestos exposure to Louisiana residents in comparison with other states as reflected in Louisiana's significantly elevated rate. Although it is expected that hospitalization rates increase with age, the racial and geographical differences are surprising. The significant difference between Blacks and Whites may reflect racial differences in occupations that were present 40 to 50 years ago.

High rates of hospitalizations in river parishes are not surprising since asbestos was heavily used in the shipbuilding industries located in these areas. However, clustering in the northeastern area of the state was not expected. The geographical clustering may reflect data limitations as parish information denotes the patient's residence at the time of hospitalization, which may not reflect where the person worked. It is expected that the hospitalization rate will remain high due to asbestosis's long latency period and the relatively recent ban on new uses. Despite stricter regulations, there is still a risk of exposure due to the continued use of many asbestos-containing products that were not affected by the ban. Monitoring the impact of these products on workers will require ongoing tracking of asbestosis cases in order to better identify high risk work practices and settings. This information, in turn, can result in a tightening of workforce regulations, if warranted. Healthcare providers can assist public health officials in this pursuit by collecting and recording patients' occupational history.

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