

## 3 FATAL ILLNESS

Fatal illness in the workplace has been of interest to the public health community since at least the 18th century, when Bernardino Ramazzini compiled the first systematic description of the diseases of workers [Ramazzini 1713]. Diseases are generally more difficult to link with work than injuries. Many diseases related to occupational exposures (e.g., tuberculosis [TB], cancers, central nervous system disorders, and asthma) are no different when encountered in the absence of occupational exposures. Work-related aspects of illness may go unrecognized for many reasons, including long latency periods between the exposure and development of some diseases and the failure of health care professionals to recognize work-related illnesses or to obtain information about work history. This chapter covers conditions generally accepted to be solely or predominantly related to work. Excluded, for example, is lung cancer, even though 16% to 17% of cases in men and 2% of cases in women are considered to be work-related.

### Pneumoconiosis

The pneumoconioses are a class of respiratory diseases attributed solely to workplace factors. From 1968 through 1996, pneumoconiosis was an underlying or contributing cause of 113,519 deaths in the United States (see Figure 1–10). The largest number of pneumoconiosis deaths were attributed to coal workers' pneumoconiosis (CWP), but deaths from this disease have declined over the years (Figure 3–1). By contrast, asbestosis deaths increased from fewer than 100 in 1968 to nearly 1,200 in 1996 (Figure 3–2). Over the same period, silicosis deaths decreased (Figure 3–3), byssinosis deaths varied substantially each year from 1979 to 1996 (Figure 3–4), and unspecified and other types of pneumoconiosis decreased (Figure 3–5).

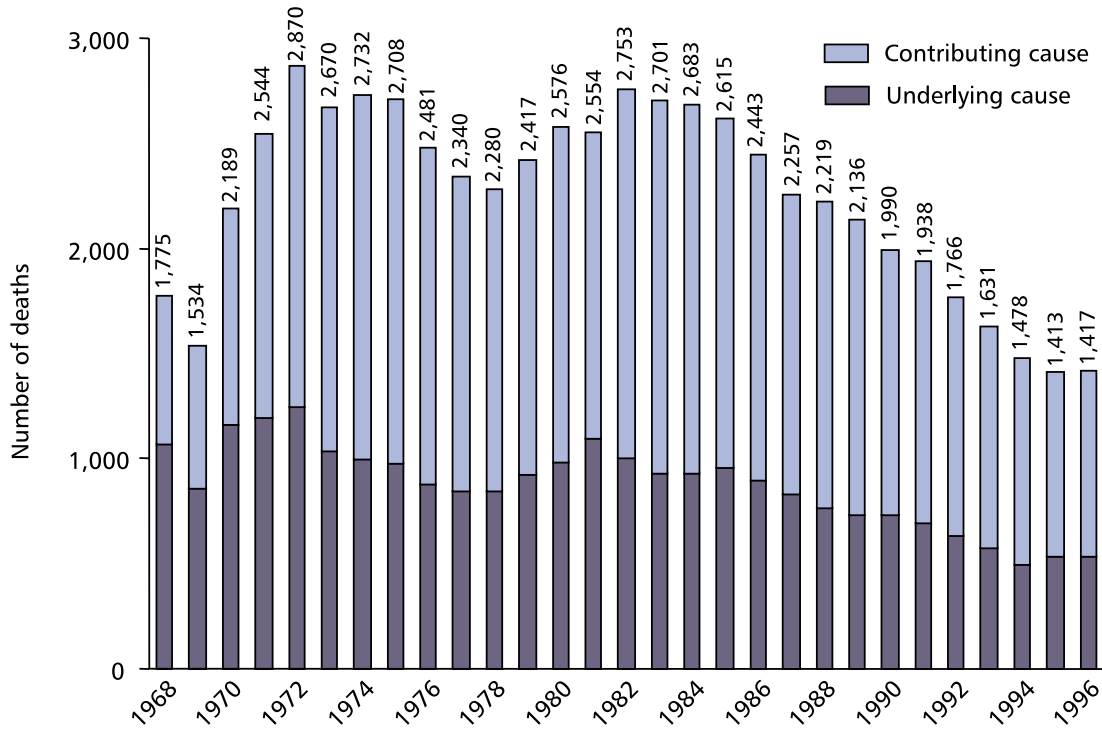


Figure 3–1. Number of deaths recorded with CWP as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1968–1996. (Source: NSSPM [1999].)

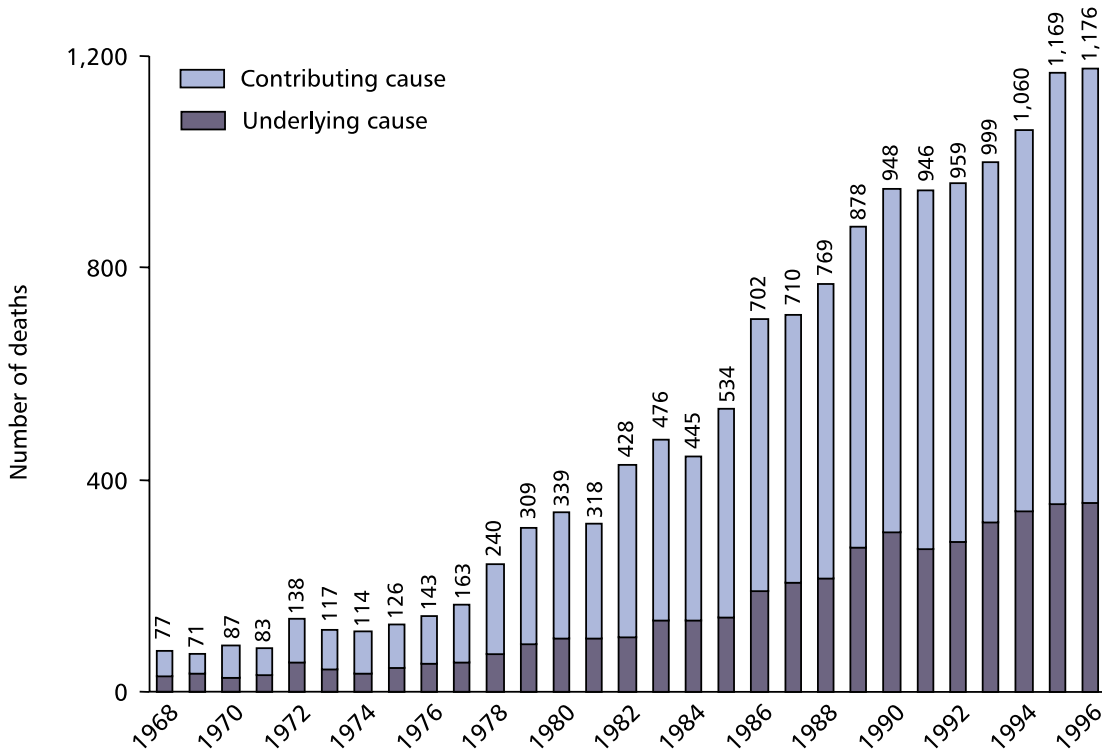


Figure 3–2. Number of deaths recorded with asbestosis as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1968–1996. (Source: NSSPM [1999].)

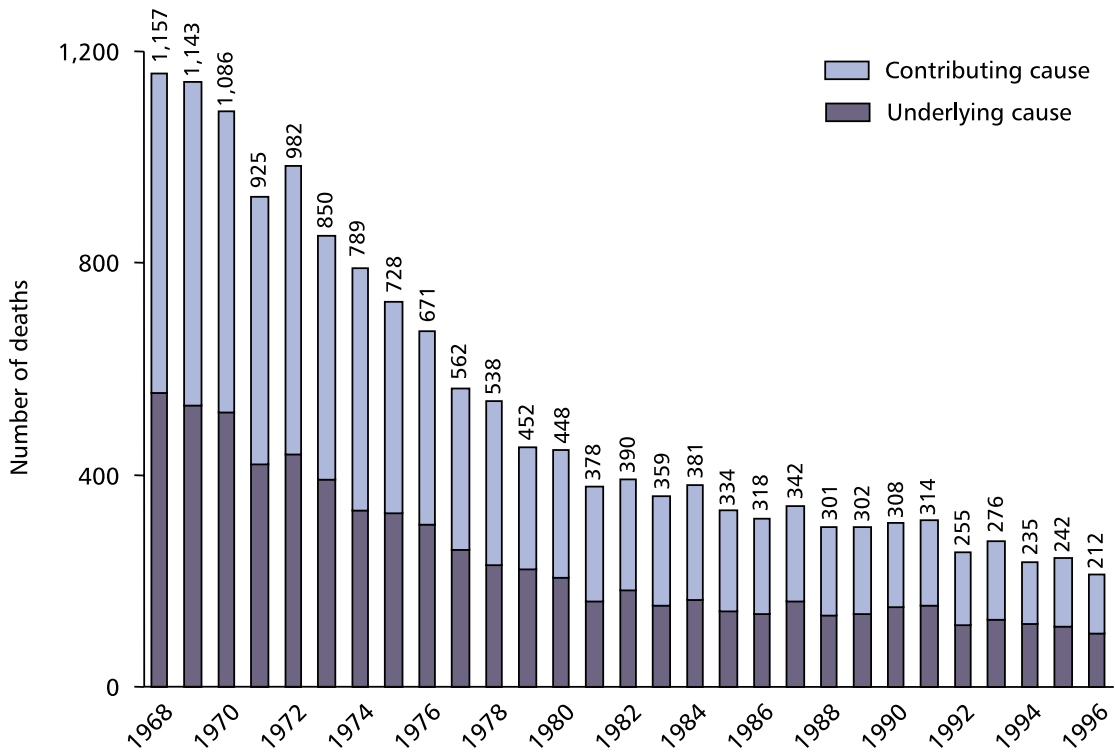


Figure 3–3. Number of deaths recorded with silicosis as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1968–1996. (Source: NSSPM [1999].)

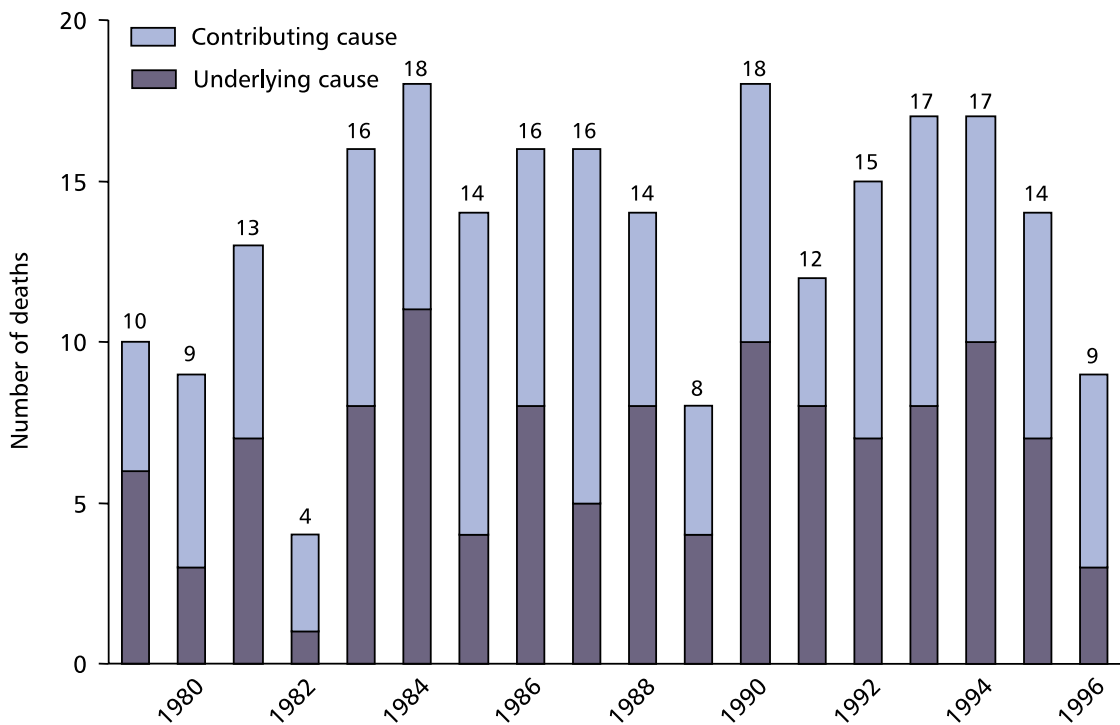


Figure 3–4. Number of deaths recorded with byssinosis as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1979–1996. (Source: NSSPM [1999].)

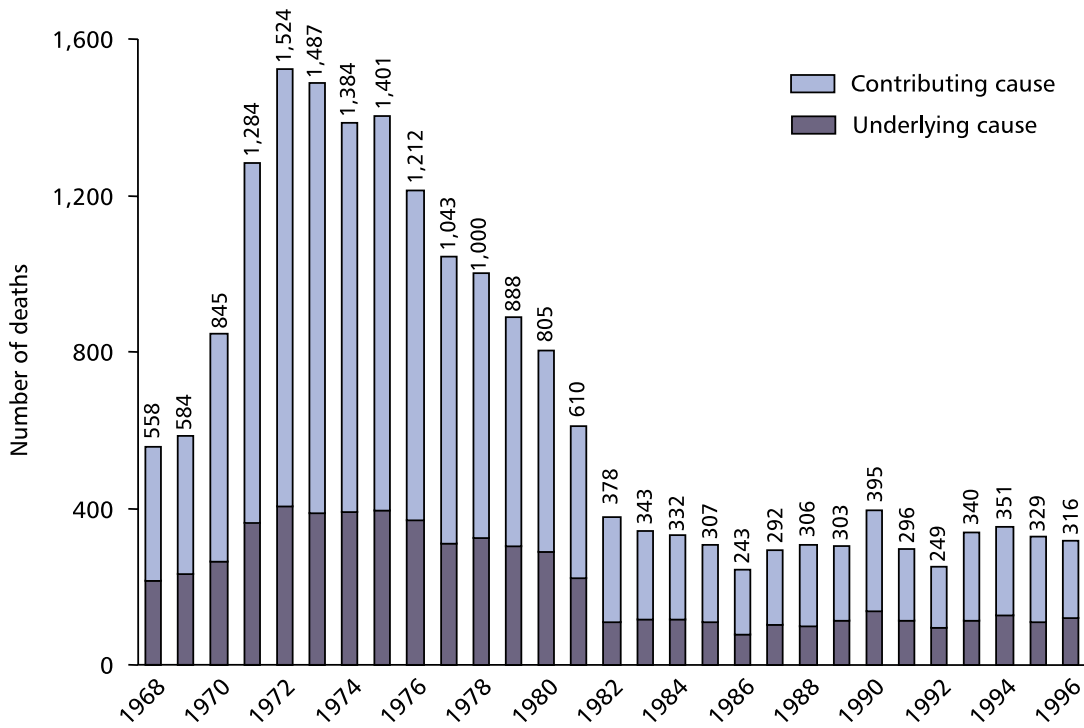


Figure 3–5. Number of deaths recorded with unspecified and other pneumoconiosis as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1968–1996. (Source: NSSPM [1999].)

### Pneumoconiosis Deaths by State

Asbestosis mortality is highest in northeastern, southern, and west coast States (Figure 3–6), and CWP mortality is highest in Appalachian mining areas (Figure 3–7). Silicosis mortality appears less concentrated by geographic region than asbestosis or CWP mortality (Figure 3–8). Byssinosis deaths are concentrated in textile-producing States (Figure 3–9). The pattern of mortality for unspecified and other pneumoconiosis most resembles that of CWP (Figure 3–10).

### Pneumoconiosis Deaths by Sex and Race

The distribution of different types of pneumoconiosis deaths varies by sex (Figure 3–11) and race (Figure 3–12). Women accounted for 28% of byssinosis deaths and less than 5% of deaths with all other types of pneumoconiosis. Blacks accounted for 15% of silicosis deaths, 13% of byssinosis deaths, and less than 7% of deaths with all other types of pneumoconiosis.

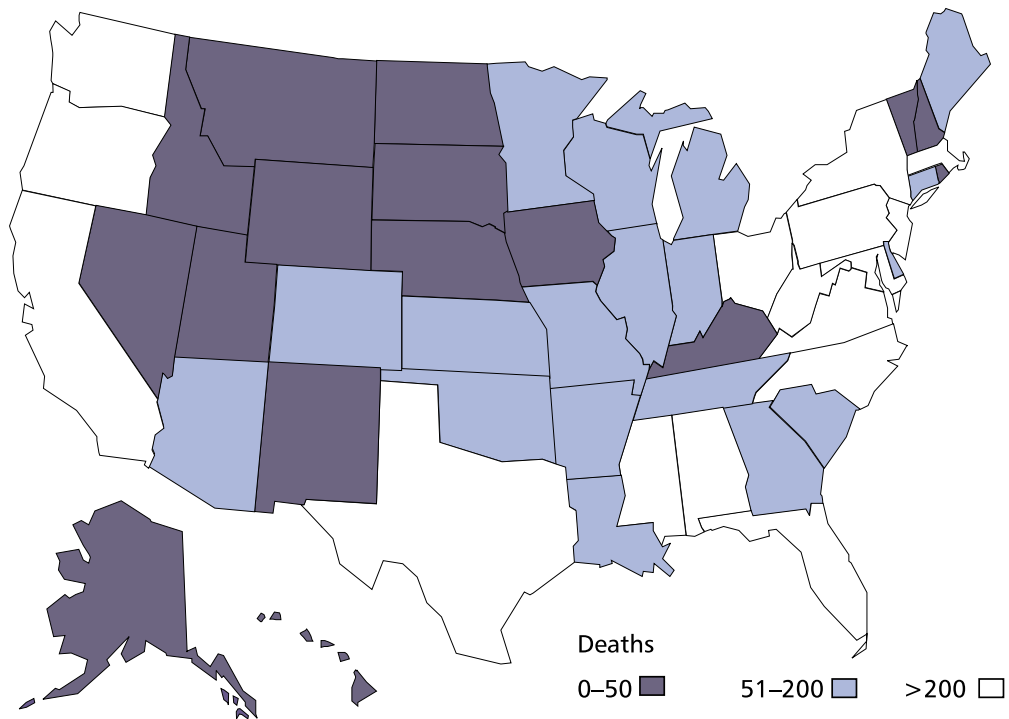


Figure 3-6. Number of asbestosis deaths by State—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

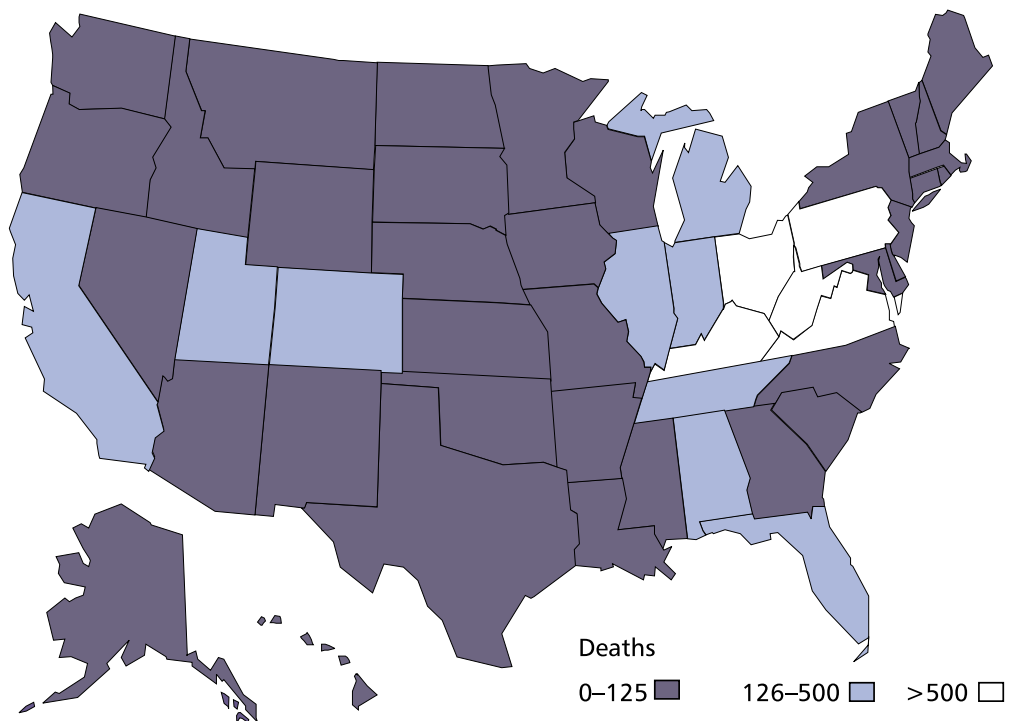


Figure 3-7. Number of CWP deaths by State—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

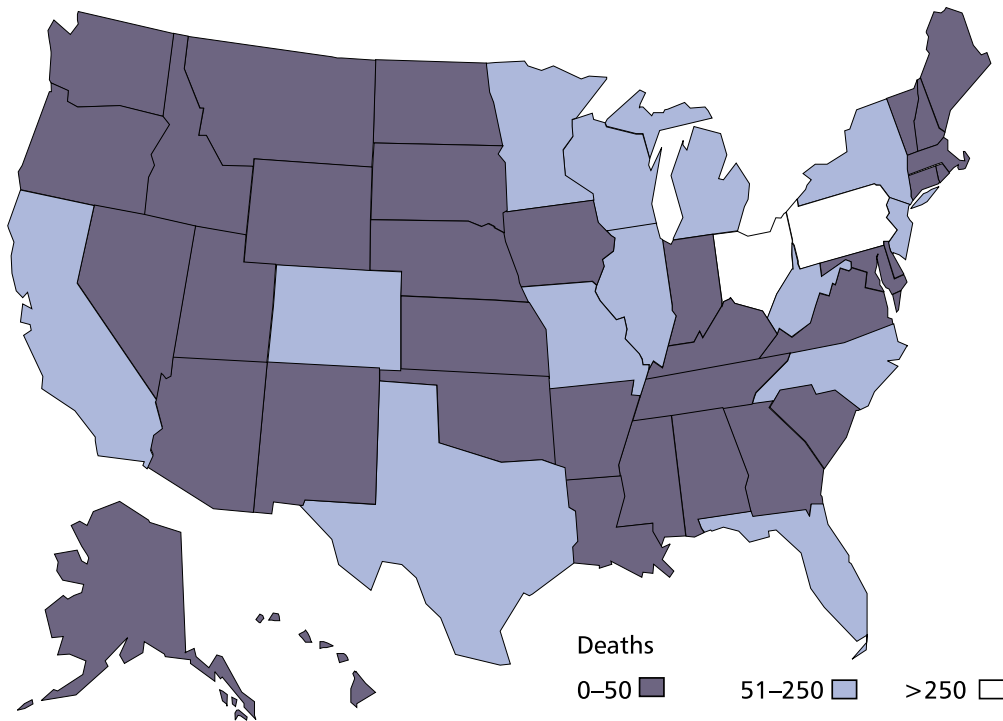


Figure 3-8. Number of silicosis deaths by State—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

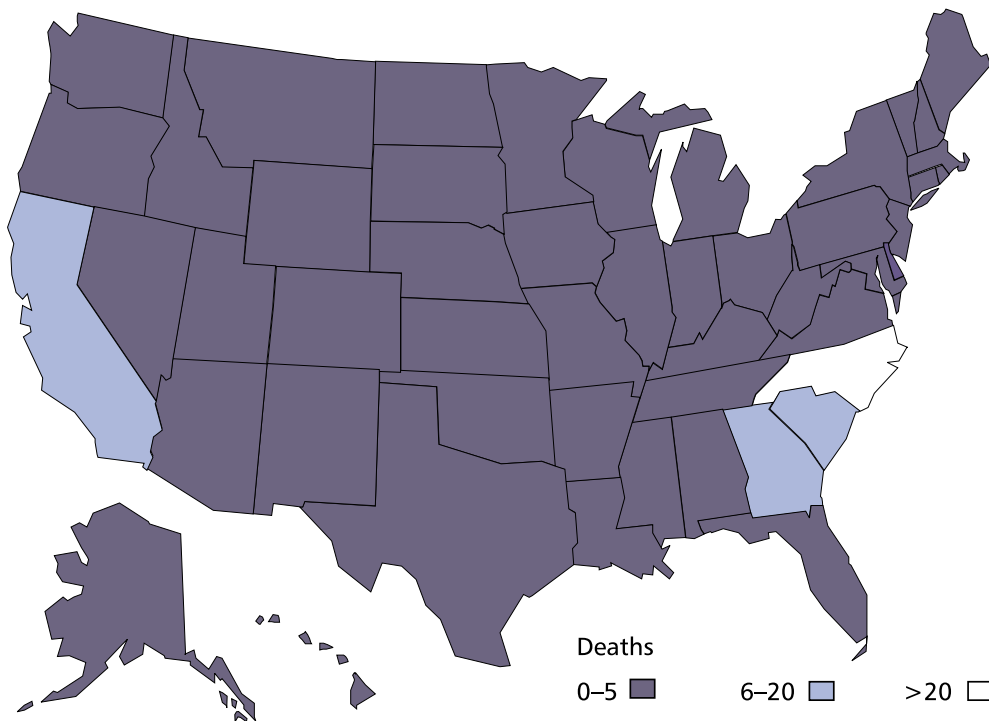


Figure 3-9. Number of byssinosis deaths by State—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

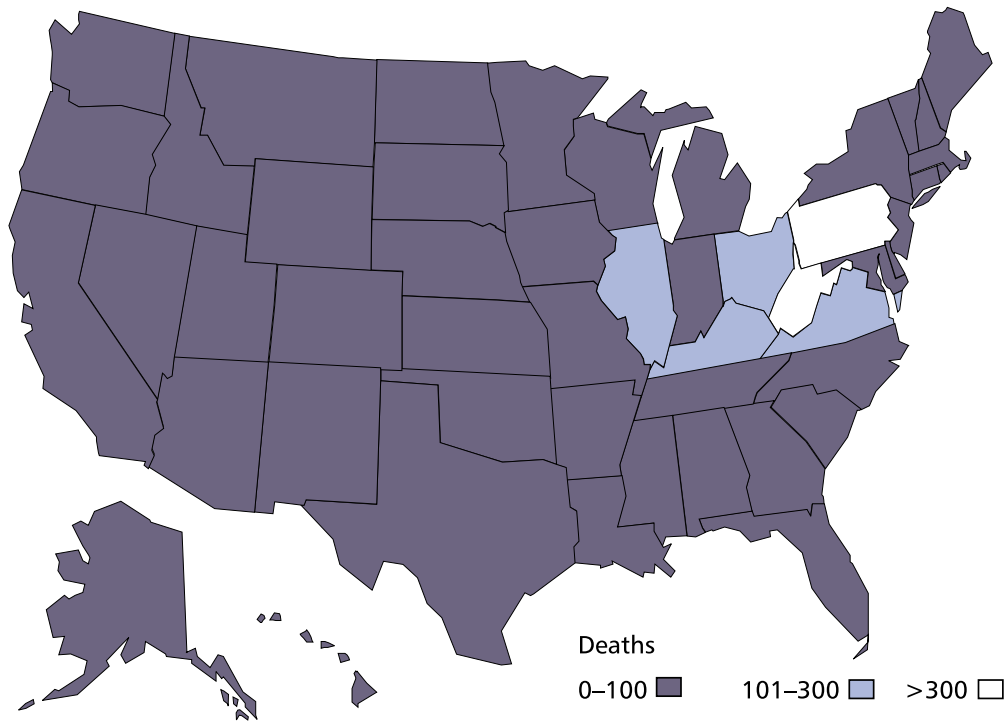


Figure 3-10. Number of unspecified and other pneumoconiosis deaths by State—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

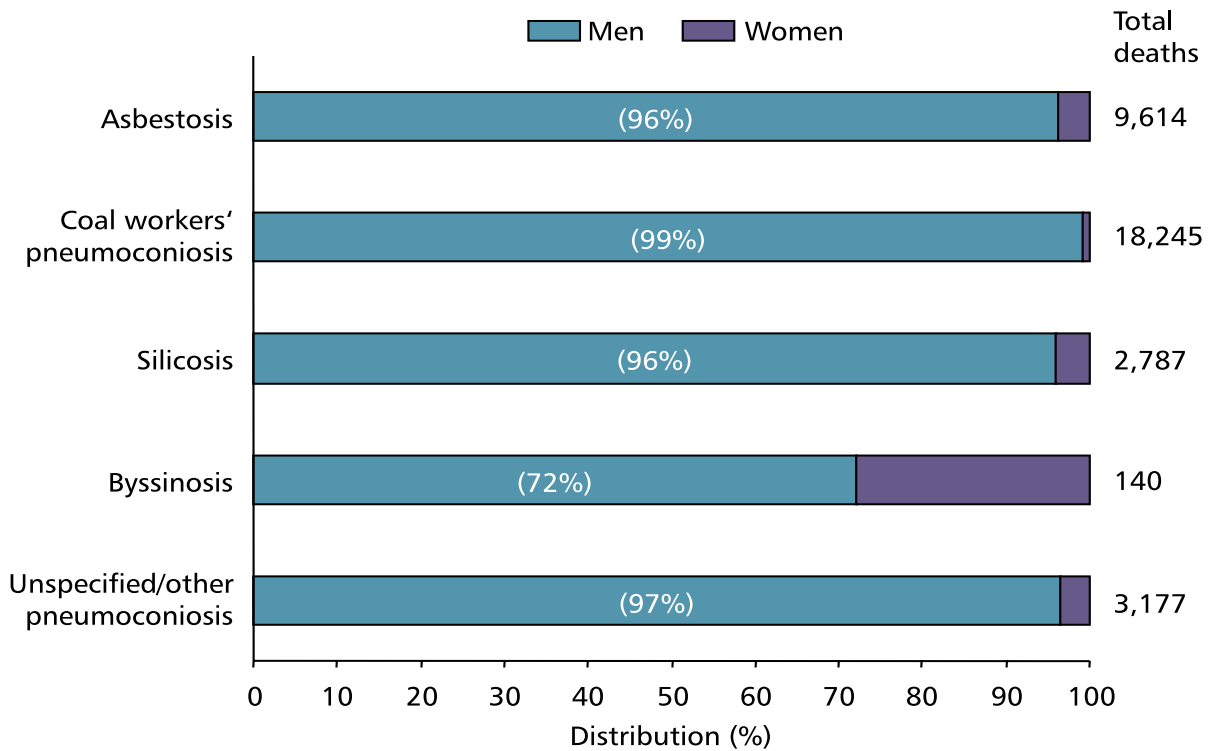


Figure 3-11. Distribution of types of pneumoconiosis deaths by sex—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

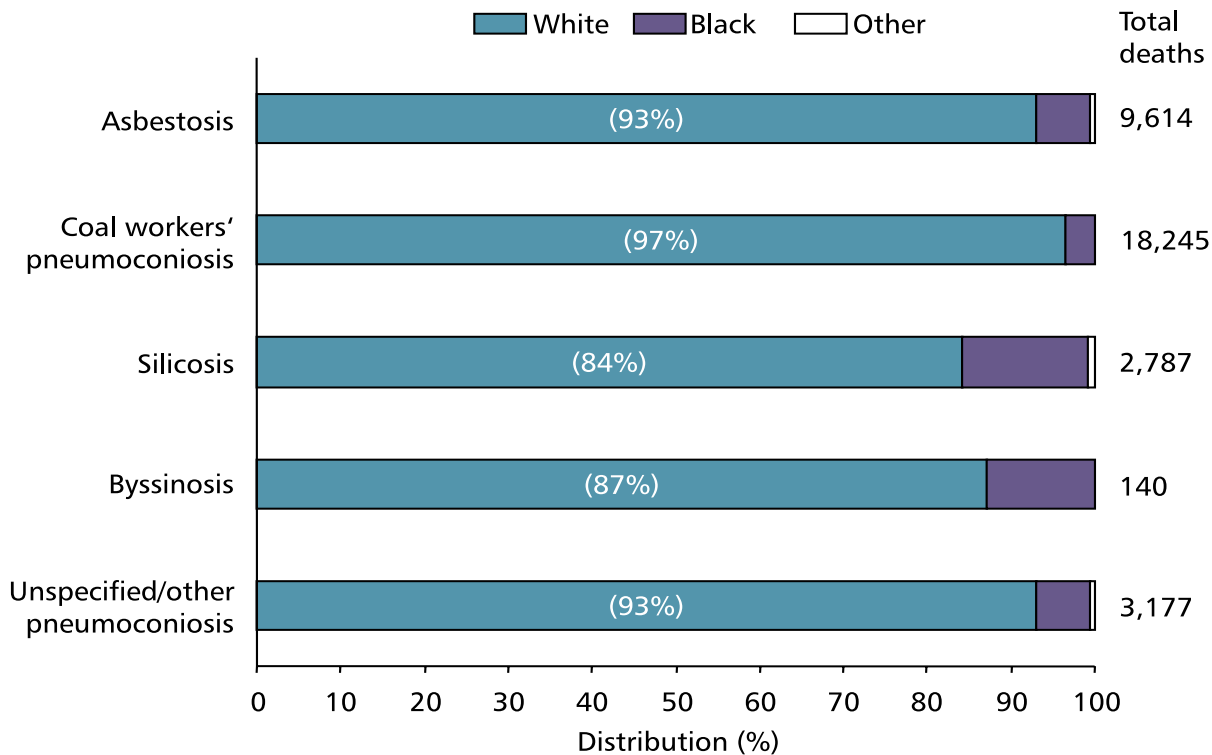


Figure 3–12. Distribution of types of pneumoconiosis deaths by race—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

### Pneumoconiosis Deaths by Occupation

Proportionate mortality ratios (PMRs) associating pneumoconiosis deaths with various occupations are presented in Figures 3–13 through 3–17. A PMR above 1.0 indicates that more deaths occurred with the condition than expected in an occupation or industry. PMRs with lower 95% confidence limits that exceed 1.0 are statistically significant. PMRs calculated from a large subset of national data indicate that mining machine operators have extremely high relative mortality from CWP and from unspecified and other pneumoconioses (Figures 3–13 and 3–14). Insulation workers and related occupations had the highest PMRs for asbestosis (Figure 3–15). Workers in metal and plastic processing, hand molding and shaping, and crushing and grinding in mining occupations had the highest PMRs for silicosis mortality (Figure 3–16). Textile machine operators and repairers had significant PMRs for byssinosis (Figure 3–17).



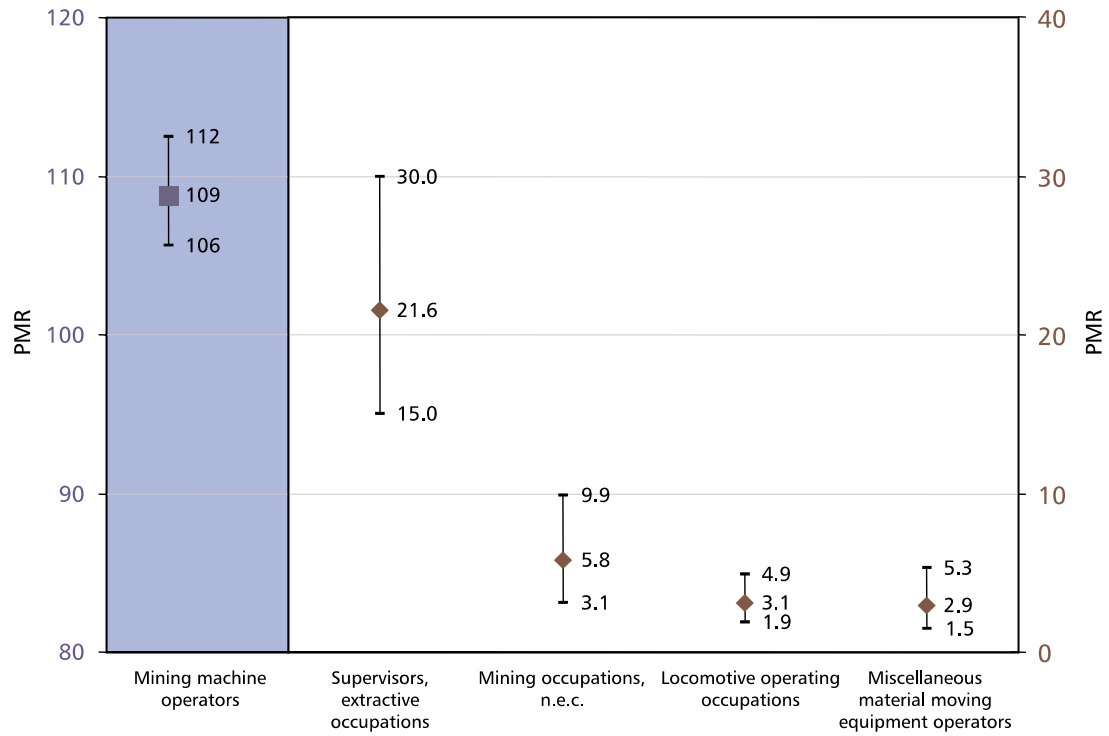


Figure 3–13. PMRs (and 95% CIs) for CWP by occupation—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

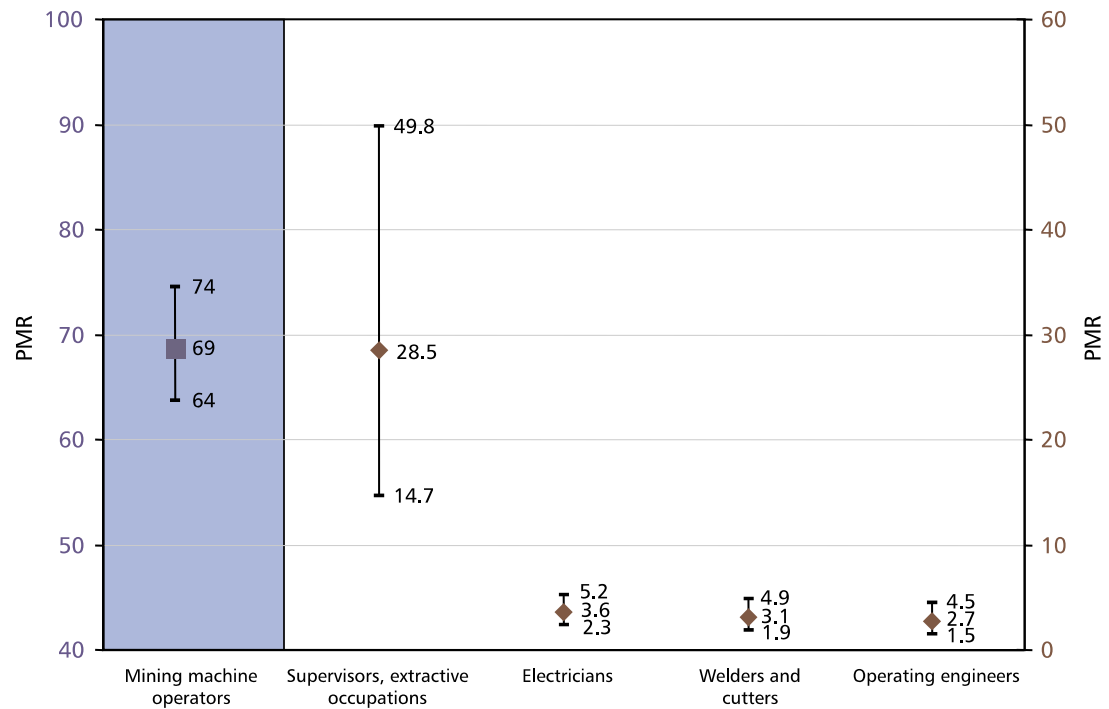


Figure 3–14. PMRs (and 95% CIs) for unspecified and other pneumoconioses by occupation—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

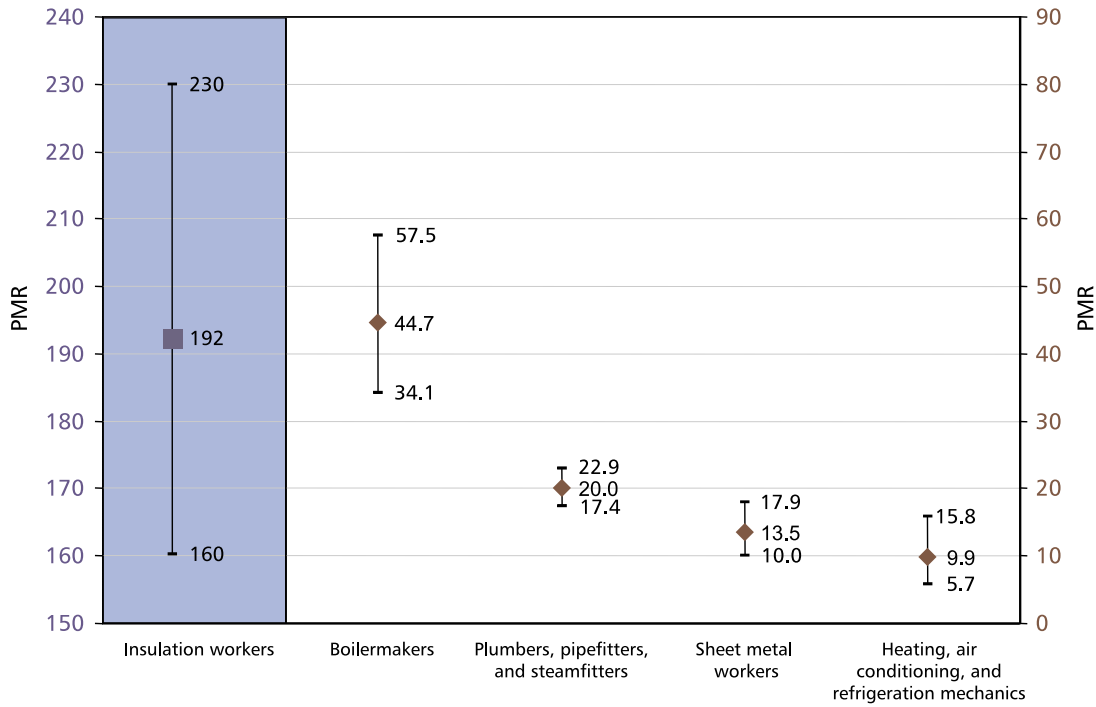


Figure 3–15. PMRs (and 95% CIs) for asbestosis by occupation—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

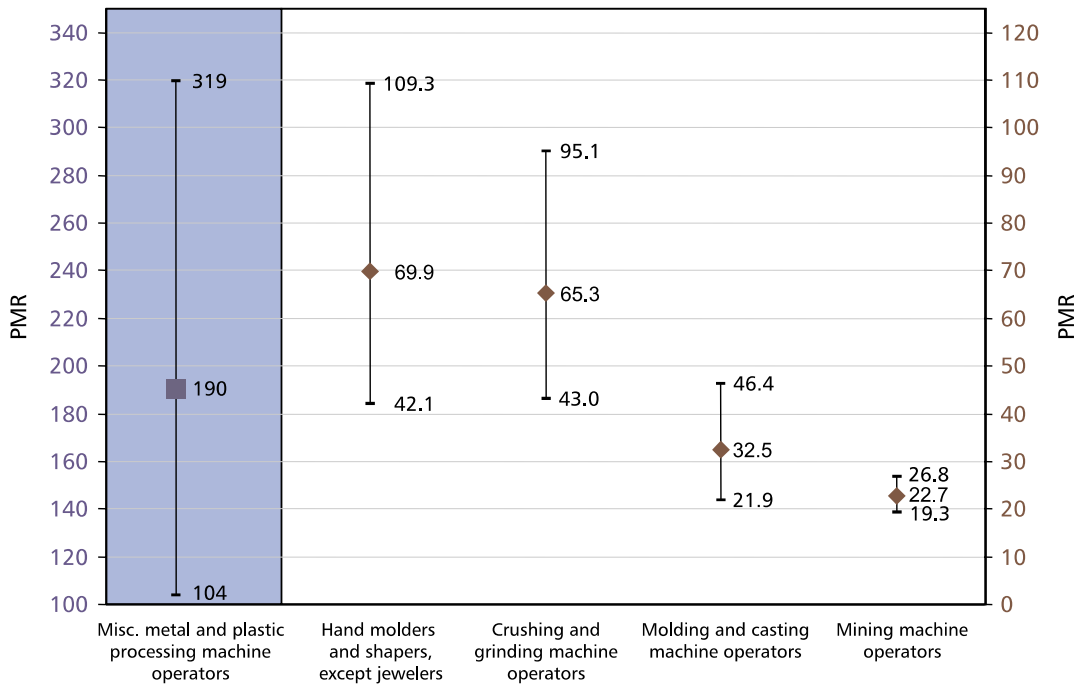
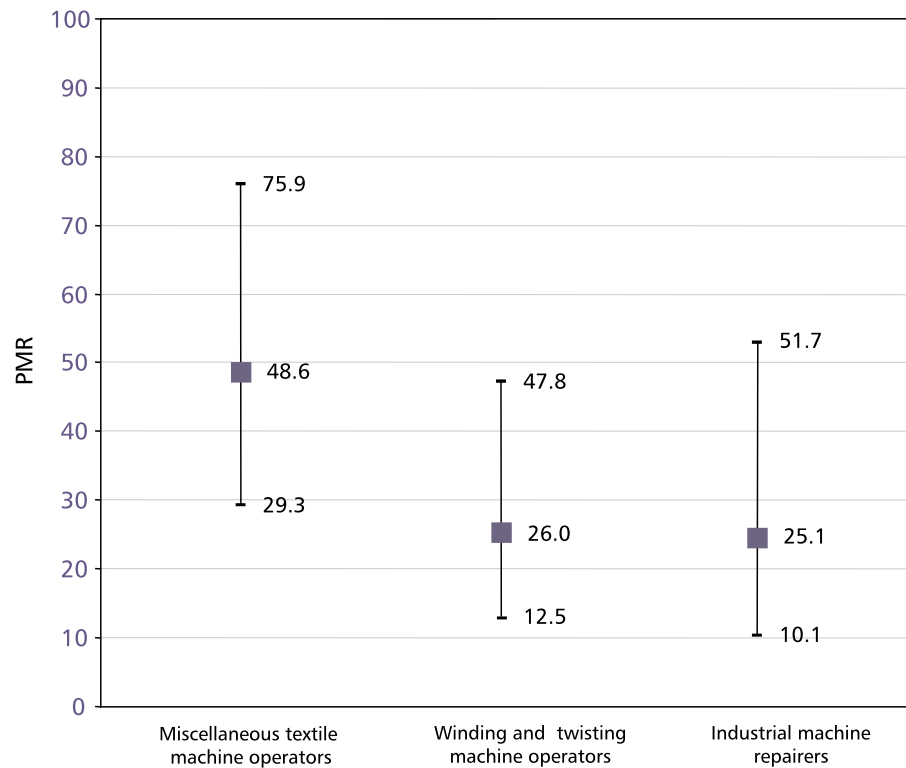


Figure 3–16. PMRs (and 95% CIs) for silicosis by occupation—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)



**Figure 3–17.** PMRs (and 95% CIs) for byssinosis in textile machine operators and repairers—U.S. residents aged 15 and older, 1987–1996. (Source: NSSPM [1999].)

## Malignant Pleural Neoplasm

Mortality due to malignant pleural neoplasm (cancer of the lung lining) can serve as a surrogate for mortality due to malignant mesothelioma (often a cancer of the lung lining) because no unique cause-of-death code is currently available for mesothelioma. Asbestos exposure is by far the leading cause of malignant mesothelioma. The number of deaths associated with malignant pleural neoplasm increased during 1968–1996 (Figure 3–18). A geographic distribution of cases is presented in Figure 3–19. From 1987 to 1996, men accounted for 76% of the deaths from malignant pleural neoplasm (Figure 3–20), and white U.S. residents accounted for 94% of these deaths (Figure 3–21). Occupations with the highest PMRs for malignant pleural neoplasm (Figure 3–22) are similar to those with high PMRs for asbestosis (Figure 3–15).

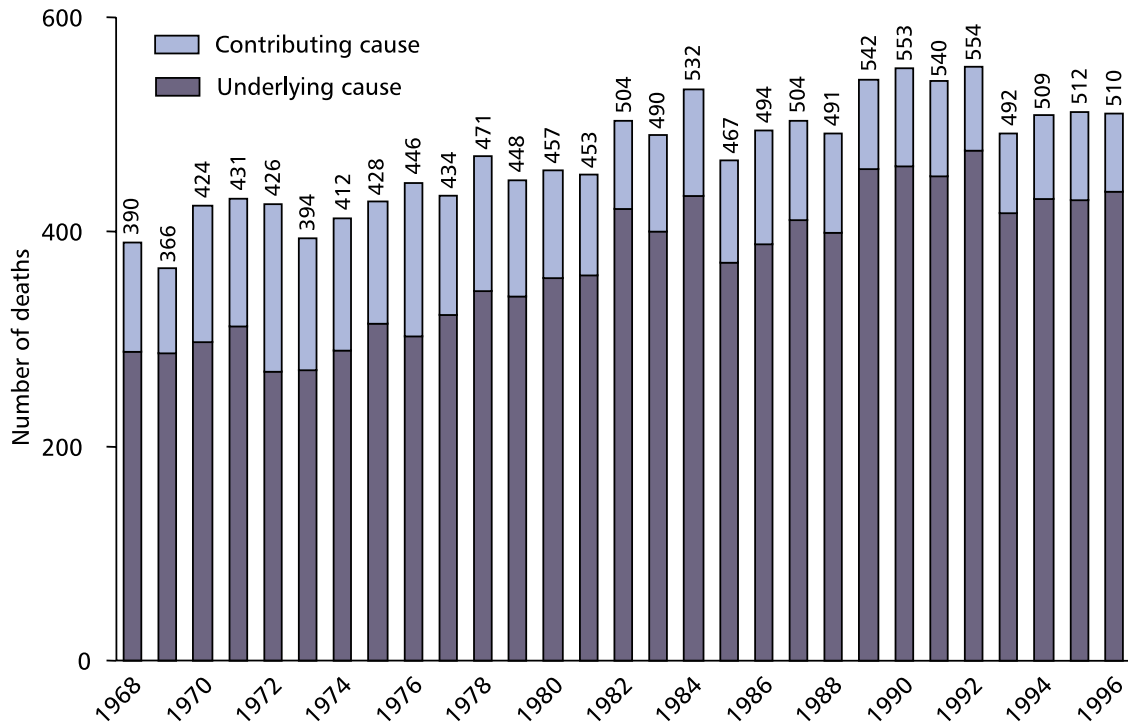


Figure 3–18. Number of deaths with malignant pleural neoplasm recorded as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1968–1996. (Source: NCHS [1999].)

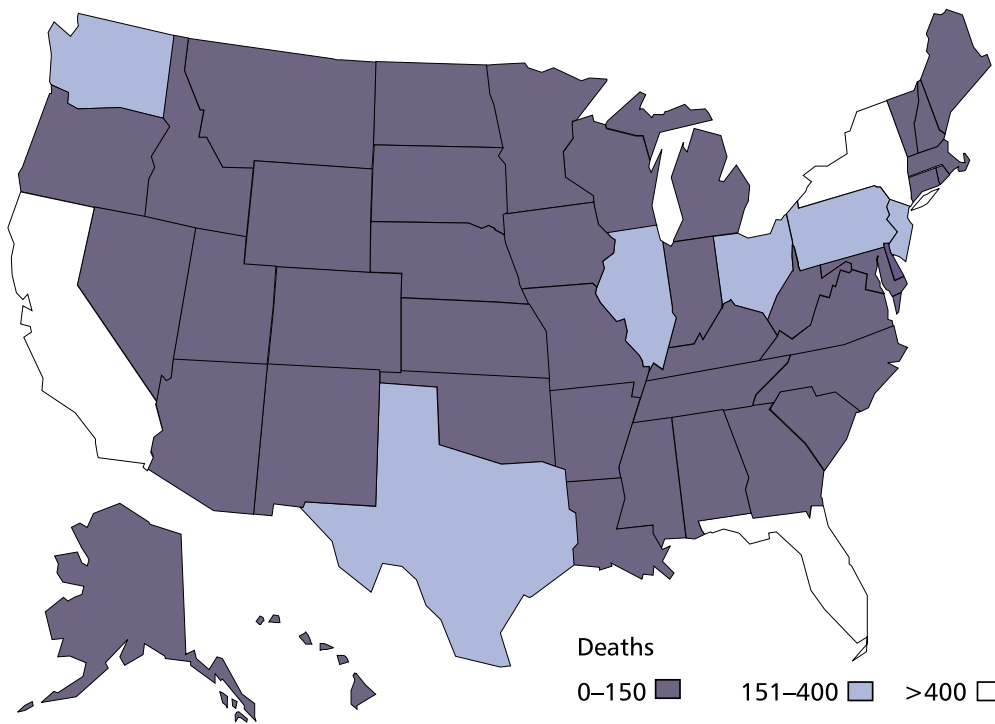
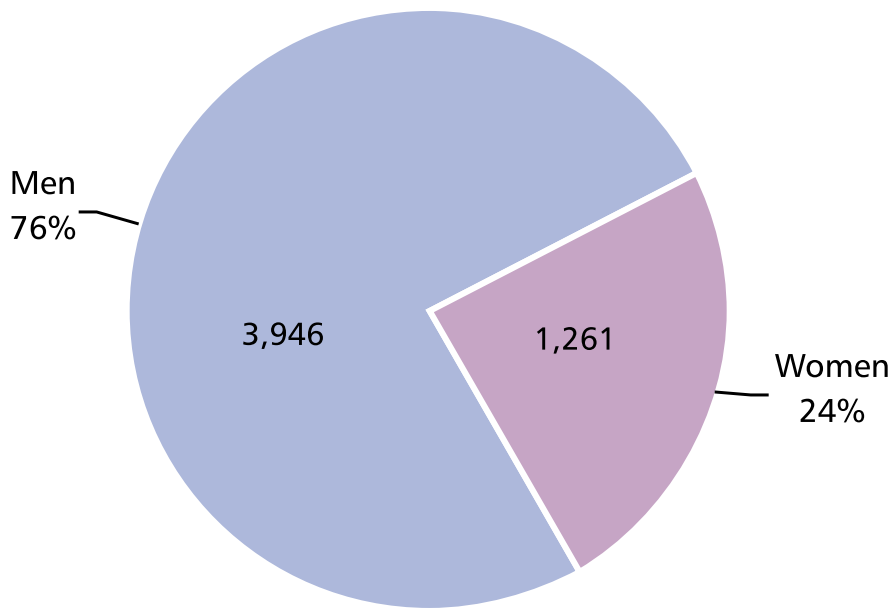
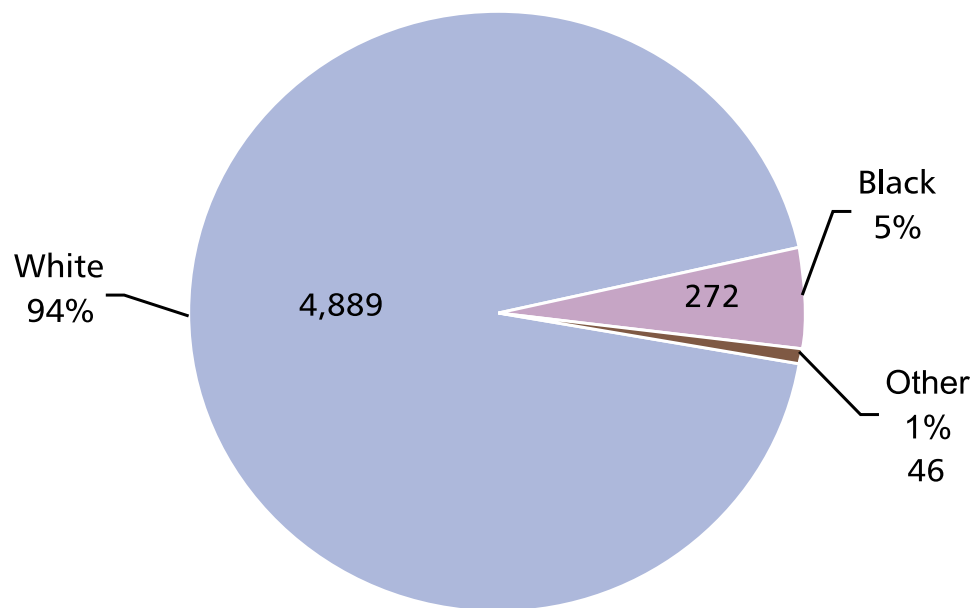


Figure 3–19. Number of deaths due to malignant pleural neoplasm by State—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)



**Figure 3–20.** Distribution and number of deaths due to malignant pleural neoplasm by sex—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)



**Figure 3–21.** Distribution and number of deaths due to malignant pleural neoplasm by race—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)

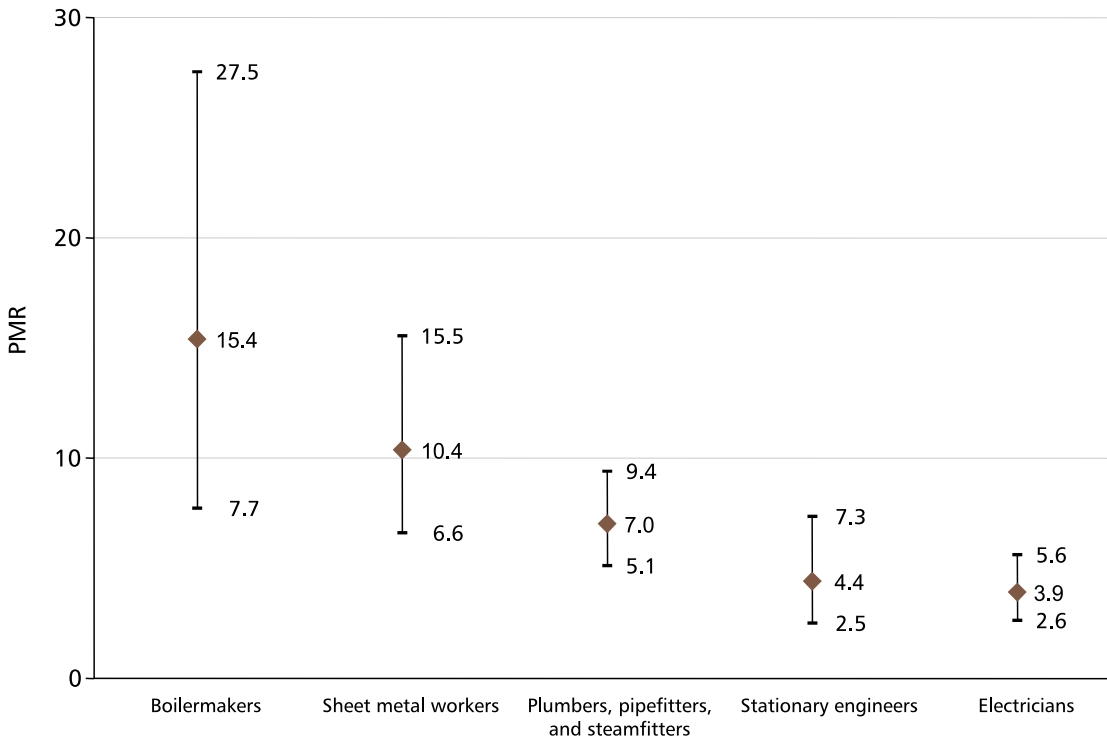


Figure 3–22. PMRs (and 95% CIs) for malignant pleural neoplasm by usual occupation—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)

## Hypersensitivity Pneumonitis

Hypersensitivity pneumonitis is a lung disease that is often related to occupation. Examples of this disease are farmers’ lung, mushroom workers’ lung, and bird fanciers’ disease. The annual number of deaths with hypersensitivity pneumonitis as an underlying or contributing cause has generally increased since 1979 (Figure 3–23). A geographic distribution of cases is presented in Figure 3–24. Nearly 30% of decedents during 1987–1996 were women (Figure 3–25), and 95% were white U.S. residents (Figure 3–26). The only occupation with a significantly high PMR for this disease was nonhorticultural farmer, with a value of 11.6 (95% confidence interval [CI] = 8.5–15.6).

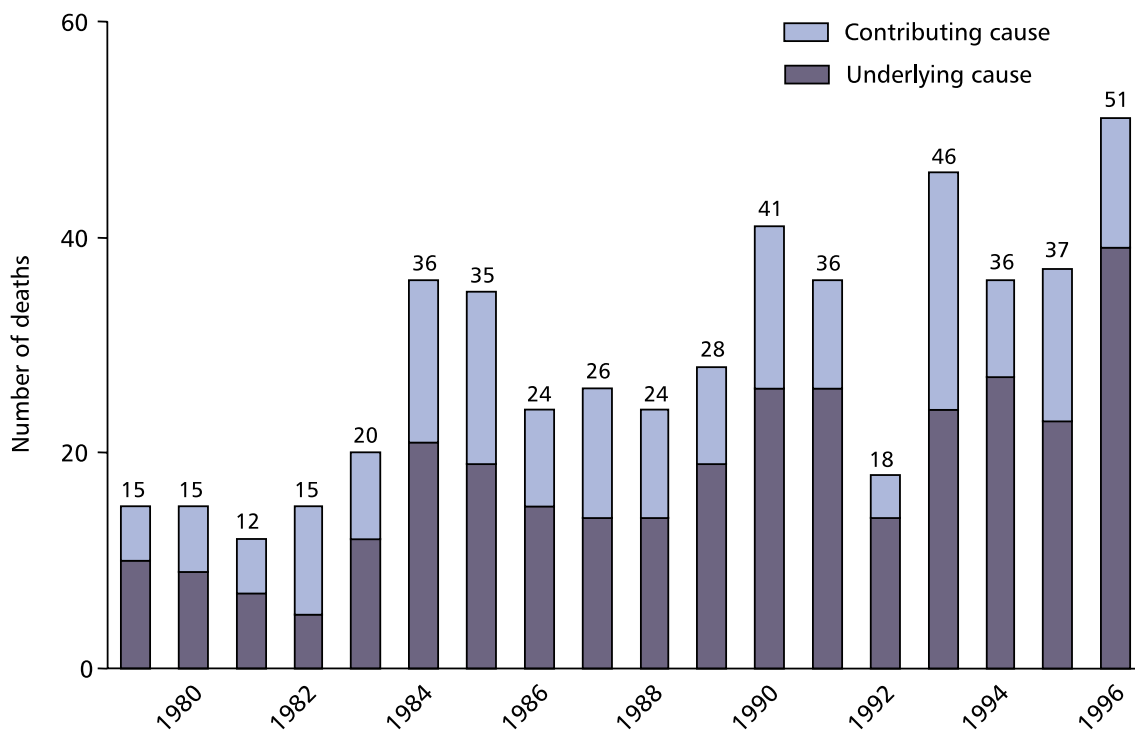


Figure 3–23. Number of deaths recorded with hypersensitivity pneumonitis as an underlying or contributing cause on the death certificate—U.S. residents aged 15 and older, 1979–1996. (Source: NCHS [1999].)

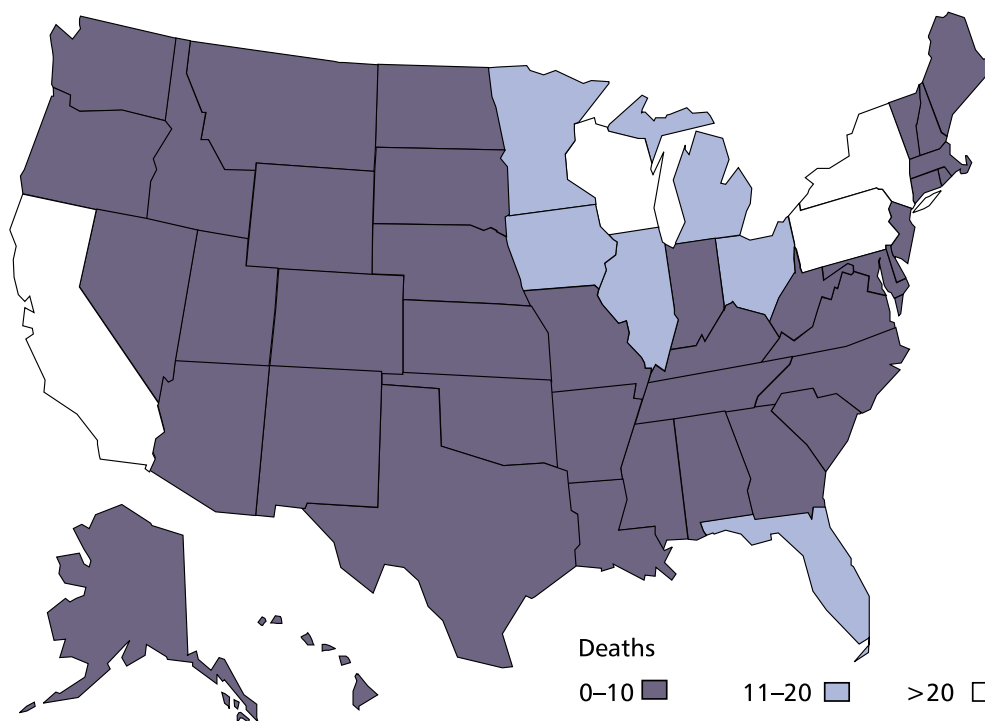
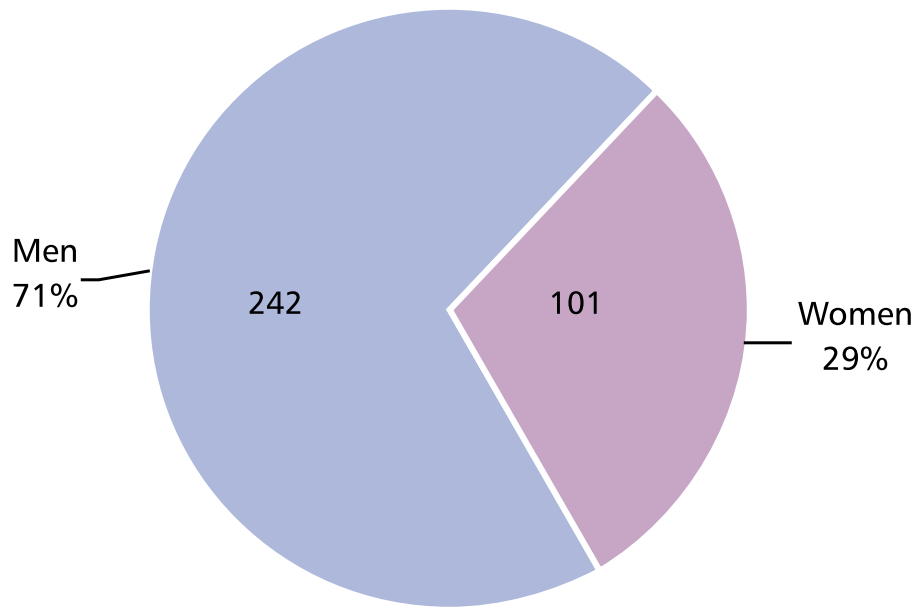
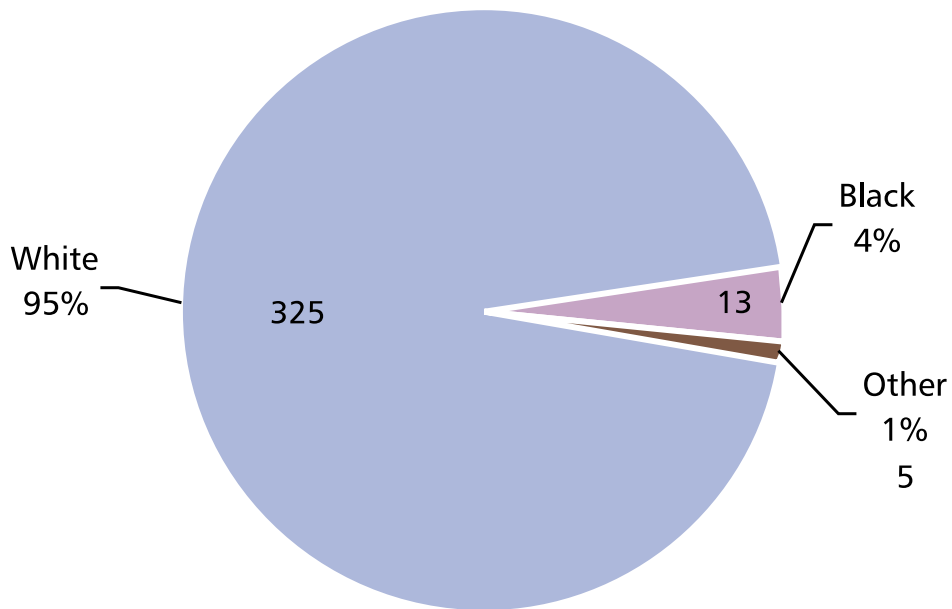


Figure 3–24. Number of hypersensitivity pneumonitis deaths by State—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)



**Figure 3–25.** Distribution and number of hypersensitivity pneumonitis deaths by sex—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)



**Figure 3–26.** Distribution and number of hypersensitivity pneumonitis deaths by race—U.S. residents aged 15 and older, 1987–1996. (Source: NCHS [1999].)