Work-Related Lung Disease Surveillance Report 2007

Division of Respiratory Disease Studies
National Institute for Occupational Safety and Health

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institutte for Occupational Safety and Health

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DHHS (NIOSH) Publication No. 2008–143a

September 2008

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This Work-Related Lung Disease (WoRLD) Surveillance Report is the seventh in a series of occupational respiratory disease surveillance reports produced by the National Institute for Occupational Safety and Health (NIOSH). It presents summary tables and figures of occupational respiratory disease surveillance data focusing on various occupationally-relevant respiratory diseases, including pneumoconioses, occupational asthma and other airways diseases, and several other respiratory conditions. For many of these diseases, selected data on related exposures are also presented.

The 2007 WoRLD Surveillance Report consists of two volumes. Volume I has three major sections: (1) a section that provides data highlights and data usage limitations; (2) a section comprised of 17 subsections, each concerning a major disease category and (where available) related occupational exposures, and one subsection concerning smoking status; and (3) a section of appendices that provide descriptions of data sources, methods, and other supplementary information. Volume II has nine sections presenting data on respiratory conditions by major industrial sector, as defined by the National Occupational Research Agenda (NORA).

Similar to the 2002 WoRLD Surveillance Report, this report includes data on hypersensitivity pneumonitis, asthma, chronic obstructive pulmonary disease, respiratory conditions due to chemical fumes and vapors, and other work-related respiratory conditions, in addition to the pneumoconioses. This report updates pneumoconiosis mortality data published in the 1999 WoRLD Surveillance Report by the addition of currently available data for 2000 through 2004. Pneumoconiosis conditions highlighted include asbestosis, coal workers' pneumoconiosis, silicosis, byssinosis, and pneumoconioses coded as either "unspecified" or "other," and all pneumoconioses aggregated. The current report presents data not included in earlier reports (e.g., the estimated prevalence of asthma, chronic obstructive pulmonary disease, and cigarette smoking based on data from the 1997–2004 National Health Interview Survey).

For many of the conditions reported on, the 2007 WoRLD Surveillance Report presents national and state summary statistics such as counts, crude and age-adjusted mortality rates, and years of potential life lost to age 65 and to life expectancy. Proportionate mortality ratios by industry and occupation are based on the most recent decade of data from a subset of states (see state list, Appendix E) for which usual industry and occupation have been coded for decedents. Also presented are U.S. state- and county-level maps showing the geographic distribution of mortality and, for the pneumoconioses, tables and figures summarizing selected occupational exposure data for asbestos, coal mine dust, silica dust, cotton dust, etc. (see agent categories, Appendix F).

Data contained in the 2007 WoRLD Surveillance Report originate from various publications, reports, data files, and tabulations provided by the Association of Occupational and Environmental Clinics (AOEC), the Bureau of Labor Statistics (BLS), the Department of Labor (DOL), the Mine Safety and Health Administration (MSHA), the National Center for Health Statistics (NCHS), the Occupational Safety and Health Administration (OSHA), NIOSH, and the Social Security Administration (SSA). Details on the major data sources and on the methods used to compute specific statistics can be found in Appendices A and B, respectively.

Interpreted with appropriate caution, the information contained in this report can help to establish priorities for research and prevention. It is also useful for tracking progress toward the elimination of important preventable occupational respiratory diseases, including those targeted in U.S. Public Health Service Healthy People objectives for the nation.

Comments and suggestions from users of earlier editions of the WoRLD Surveillance Report have influenced the content and format of this 2007 edition. To increase the utility of future editions, comments on the current report, descriptions of how the information is or could be used, and suggestions of other data for inclusion in future reports are invited.

See page ii of this report for information on how to order copies of previous Work-Related Lung Disease Surveillance Reports, described on the next page.

Send comments, suggestions, and other correspondence to:

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WoRLD Surveillance Report, 1991
http://www.cdc.gov/niosh/docs/91-113/91-113.html
The 1991 report is the first in the series of WoRLD Surveillance Reports. Data presented in the report, most of which relates to the 1968-1987 time period, originated from the National Institute for Occupational Safety and Health (NIOSH), the National Center for Health Statistics (NCHS), the Bureau of Labor Statistics (BLS), the Mine Safety and Health Administration (MSHA), the Occupational Safety and Health Administration (OSHA), the Department of Labor (DOL), the Health Care Financing Administration (HCFA), and the Social Security Administration (SSA). The 1991 report is organized into two major sections, one of figures and the other of tables. Within each section, data are presented in the following sub-headings: asbestosis, coal workers' pneumoconiosis, silicosis, exposure to cotton dust, pneumonopathy due to inhalation of other dust (i.e., byssinosis), hypersensitivity pneumonitis, toxic agents, dust diseases of the lung, and compensation.

WoRLD Surveillance Report Supplement, 1992
http://www.cdc.gov/niosh/docs/91-113s/91-113s.html
The 1992 supplement presents updated data for many of the figures and tables presented in the 1991 report, including mortality data through 1988. In addition, the 1992 supplement includes data not previously presented: (1) sex, race, geographic distribution, usual industry, and usual occupation, supplementing mortality data presented in the 1991 report; (2) number of discharges with silicosis, asbestosis, or coal workers' pneumoconiosis from the National Hospital Discharge Survey; and (3) reports of occupational asthma and silicosis from the Sentinel Event Notification Systems for Occupational Risks (SENSOR) Program.

WoRLD Surveillance Report, 1994
http://www.cdc.gov/niosh/docs/94-120/94-120.html
Data presented in the 1994 report originate generally from programs and activities described in the 1991 and 1992 reports. The 1994 report is divided into 11 major sections, most containing both figures and data tables. Ten sections summarize mortality and morbidity data and other information, such as occupational exposures, for types of pneumoconiosis, malignant neoplasms of the pleura, hypersensitivity pneumonitis, occupational asthma, and other lung conditions. The final section provides data from the Association of Occupational and Environmental Clinics (AOEC) Disease Surveillance Database. The 1994 report contains major additions, including previously unreported data, such as those from the National Health Interview Survey (NHIS) and the AOEC, and additional statistical measures, such as proportionate mortality ratios, both crude and age-adjusted rates at national and state levels, and years of potential life lost to age 65 and to life expectancy.

WoRLD Surveillance Report, 1996
http://www.cdc.gov/niosh/docs/96-134/96-134.html
The 1996 report focuses entirely on pneumoconiosis mortality and related exposures, providing updated mortality data from 1968 through 1992. It has three sections: (1) a section that describes data highlights and data limitations; (2) a section that updates and expands national data provided in the 1994 report; and (3) a section that provides detailed profiles of relevant data for each state in the U.S. Surveillance data include counts, crude and age-adjusted rates, years of potential life lost, and proportionate mortality ratios by industry and occupation. The 1996 report presents detailed tables of pneumoconiosis mortality data for each state and for the District of Columbia, as well as for counties within each state. It also presents county-level maps showing the geographic distribution of mortality for each pneumoconiosis and showing results of federal occupational exposure inspection sampling for agents that cause pneumoconiosis.

WoRLD Surveillance Report, 1999
http://www.cdc.gov/niosh/docs/2000-105/2000-105.html
The 1999 report is similar in content and organization to the 1994 WoRLD Surveillance Report. It is structured into three sections with 13 sub-sections which summarize mortality and morbidity data and other information, such as occupational exposures, for each type of pneumoconiosis and all pneumoconioses, malignant neoplasms of the pleura, hypersensitivity pneumonitis, occupational asthma, and other lung conditions. Major additions were sub-sections for pulmonary tuberculosis and chronic obstructive pulmonary disease. Mortality data published in the 1994 and 1996 World Surveillance Reports are updated through 1996. The 1994 report contains major additions, including previously unreported data, such as that from the National Health and Nutrition Examination Survey (NHANES). Reports of occupational asthma and silicosis from the Sentinel Event Notification Systems for Occupational Risks (SENSOR) Program are updated through 1995; updated summaries from the Association of Occupational and Environmental Clinics (AOEC) are provided for 1991-1996.

WoRLD Surveillance Report, 2002
http://www.cdc.gov/niosh/docs/2003-111/2003-111.html
The 2002 report is similar in content and organization to the 1999 WoRLD Surveillance Report. It is structured into three sections with 16 sub-sections which summarize mortality and morbidity data and other information, such as occupational exposures, for each type of pneumoconiosis and all pneumoconioses, malignant neoplasms of the pleura, hypersensitivity pneumonitis, occupational asthma, and other lung conditions. Mortality data published in the 1999 World Surveillance Report are updated through 1999. In addition to updated content, entirely new content in the 2002 edition includes data on condi-

tions not included in earlier reports (e.g., malignant mesothelioma, lung cancer, and other interstitial pulmonary disease), and data on smoking status by industry and occupation.

This report was prepared primarily by staff of the Public Health Surveillance Team, Surveillance Branch, Division of Respiratory Disease Studies (DRDS), NIOSH. Major contributors include: Ki Moon Bang, Robert M. Castellan, Brent C. Doney, Margaret Filios, Mark F. Greskevitch, Kenneth D. Linch, Jacek Mazurek, Nicholas Perich, Cathy J. Rotunda, Patricia Schleiff, Girija Syamlal, and John M. Wood. Mei Lin Wang and Edward Lee Petsonk of the Workforce Screening and Surveillance Team, Surveillance Branch, and Janet M. Hale of the Communications and Information Activity, DRDS, provided helpful assistance. Michael D. Attfield, Chief, Surveillance Branch, and David N. Weissman, Director, DRDS, provided guidance.

Special appreciation is expressed for the cooperation of staff at the Occupational Safety and Health Administration (OSHA) and at the Mine Safety and Health Administration (MSHA) for providing exposure data files, to the Association of Occupational and Environmental Clinics (AOEC) for providing data from their occupational disease database, and to state-level SENSOR Program staff, who provided data on silicosis and work-related asthma.

Draft portions of this report were provided for review and comment to individuals associated with public health agencies and other governmental organizations, as well as to others within NIOSH. Their comments have been considered in the final version of this report.

Abbreviations

ACGIH®	American Conference of Governmental Industrial Hygienists
AOEC	Association of Occupational and Environmental Clinics
BLS	Bureau of Labor Statistics
BoC	Bureau of the Census
CDC	Centers for Disease Control and Prevention
CFR	*Code of Federal Regulations*
CI	confidence interval
CIC	Census Industry Code
COC	Census Occupation Code
COPD	chronic obstructive pulmonary disease
CWP	coal workers' pneumoconiosis
CWXSP	Coal Workers' X-ray Surveillance Program
CXR	chest x-ray
DFR	Doctor's First Report
DHHS	Department of Health and Human Services
DOL	Department of Labor
DRDS	Division of Respiratory Disease Studies
f/cc	fibers per cubic centimeter
FEV_1	forced expiratory volume in one second
GM	geometric mean
HCFA	Health Care Financing Administration
ICD	International Classification of Diseases
ILO	International Labour Office
IMIS	Integrated Management Information System
LCL	lower confidence limit
MQC	minimum quantifiable concentration
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
MMWR	*Morbidity and Mortality Weekly Report*
MNMD	metal/nonmetal mine data
mppcf	millions of particles per cubic foot
MRE	Mining Research Establishment
MSHA	Mine Safety and Health Administration
NCHS	National Center for Health Statistics
n.e.c.	not elsewhere classified
NHANES	National Health and Nutrition Examination Survey
NHDS	National Hospital Discharge Survey
NIOSH	National Institute for Occupational Safety and Health
n.o.s.	not otherwise specified
OA	occupational asthma
OSHA	Occupational Safety and Health Administration
PEFR	peak expiratory flow rate
PEL	permissible exposure limit
PHS	Public Health Service
PMF	progressive massive fibrosis
PMR	proportionate mortality ratio
PPD	purified protein derivative
REL	NIOSH recommended exposure limit
RADS	reactive airways dysfunction syndrome
SIC	Standard Industrial Classification
SSA	Social Security Administration
SENSOR	Sentinel Event Notification Systems for Occupational Risks
SOP	standard operating procedure
SUDAAN®	Survey Data Analysis (software)
TLV®	Threshold Limit Value
TWA	time-weighted average
UCL	upper confidence limit
WOHL	Wisconsin Occupational Health Laboratory
WoRLD	Work-Related Lung Disease
WRA	work-related asthma
YPLL	years of potential life lost

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Highlights and Limitations

Selected Highlights

The following paragraphs highlight selected findings based on data from the United States presented in this and previous WoRLD Surveillance Reports.

Asbestosis and Related Exposures

• Asbestosis deaths among U.S. residents age 15 and over have increased from 78 in 1968 to 1,493 in 2000 and then decreased slightly to 1,470 in 2004. (Figure 1-1, Table 1-1)

• Over the 10-year period from 1995 to 2004, there were more than 13,000 asbestosis deaths and annual asbestosis death counts increased by one-fourth. (Table 1-1)

• During the 10-year period from 1995 to 2004, asbestosis deaths accounted for nearly half of all pneumoconiosis deaths. (Table 6-6)

• For each year since 1998, asbestosis deaths outnumbered coal workers' pneumoconiosis (CWP) deaths, displacing CWP as the most frequent type of pneumoconiosis death. (Table 1-1, Table 2-1)

• Asbestosis was designated as the underlying cause of death in over one-third of all asbestosis deaths from 1995 to 2004. (Table 1-1)

• Residents of California, Florida, New Jersey, New York, Pennsylvania, Texas, Virginia, and Washington together accounted for nearly half of all asbestosis deaths in the 1995 to 2004 period. (Table 1-4)

• For the period from 1995 to 2004, three counties (one in Montana, one in Mississippi, and one in Texas) had age-adjusted asbestosis death rates that exceeded the national rate by more than 20-fold. (Table 1-2, Table 1-10)

• Based on a large subset of the national data for which decedents' usual occupation and industry information was available, the *construction* industry accounted for nearly one-fourth of decedents with asbestosis from 1990 through 1999. Apart from *construction*, asbestosis deaths were reported in a wide range of industries, with no particular industry predominating. Similarly, no one occupation emerged as being particularly common, though the most frequently listed occupational group was *plumbers, pipefitters, and steamfitters*. (Table 1-6, Table 1-7)

• From 1990 to 1999, decedents whose death certificate indicated that they worked in the *miscellaneous nonmetallic mineral and stone products* industry or the *ship and boat building and repairing industry* had proportionate asbestosis mortality more than 15 times higher than that of all industries combined. (Table 1-8)

• From 1990 to 1999, decedents whose death certificate indicated that they were *insulation workers* or *boilermakers* had proportionate asbestosis mortality 20 times higher than that in all occupations combined. (Table 1-9)

• Hospital discharges associated with asbestosis have increased from approximately 9,000 in 1995 to 21,000 in 2004. (Table 1-11)

• Data from the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) indicate a trend towards lower asbestos exposure levels from 1979 to 1999, concomitant with mandated reductions in the OSHA permissible exposure limit (PEL). However, data indicate a steady increase in asbestos exposure levels in the *mining* industry for the years 2000 through 2003 and a slight rise in all other industries in the two years previous to 2003. (Figure 1-5, Table 1-12)

• For the period 1995 to 2003, less than 5% of the MSHA and OSHA asbestos exposures exceeded the recommended exposure limit (REL). The *nonmetallic mining and quarrying*, except *fuel and miscellaneous nonmetallic mineral and stone products* industries had the highest percent of samples exceeding the REL (9.9% and 8.7%, respectively). (Table 1-13)

Coal Workers' Pneumoconiosis (CWP) and Related Exposures

• Among active coal miners with 20–24, 25–29, and over 30 years of underground mining who were examined in a federally-administered health monitoring program, the prevalence of radiographically evident CWP declined from 20%, 25%, and 35% in the early 1970s to about 3%, 3%, and 7% in the late 1990s; however, it increased to 6%, 8%, and nearly 10% in the mid 2000s, respectively. (Table 2-12, Figure 2-5)

• CWP deaths among U.S. residents age 15 and over continue a long-term decline, from well over 2,500 deaths annually in the early 1980s to well below 1,000 in the early 2000s. (Figure 2-1)

• CWP deaths accounted for over one-third of pneumoconiosis deaths during the 10-year period from 1995 to 2004. (Table 6-6)

• CWP was designated as the underlying cause of death in over one-third of all CWP deaths from 1995 to 2004. (Table 2-1)

• For the decade from 1995 to 2004, more than three-fourths of all CWP decedents were residents of Pennsylvania, West Virginia, Virginia, and Kentucky. Pennsylvania alone accounted

for nearly half of all CWP deaths in this period. (Table 2-4)

• For the period from 1995 to 2004, seven counties (two in Virginia, one in Pennsylvania, one in Kentucky, and three in West Virginia) had age-adjusted CWP death rates that exceeded the national rate by more than 100-fold. (Table 2-10)

• From 1990 to 1999, a large majority of CWP deaths were associated with employment in the *coal mining* industry, for which proportionate CWP mortality was more than 50 times higher than that of all occupations combined. (Table 2-6, Table 2-8)

• Federal "Black Lung" Program payments totaled more than $675 million for nearly 15,000 beneficiaries in 2005. These figures reflect a continuing slow decline from over $1.8 billion paid out for over 500,000 beneficiaries in 1980. (Table 2-13)

• Data from MSHA indicate that from the early 1980s to 2003 the underground *coal mining* industry experienced little change in level of exposure to respirable coal mine dust. Surface mine exposure levels have also remained fairly steady although there is some evidence of a decline in exposure levels since the early 1990s. (Figure 2-7, Table 2-14)

• During the period 1995 to 2003, one-fourth of coal mine dust exposures recorded by MSHA exceeded the REL. (Table 2-15, Table 2-16)

Silicosis and Related Exposures

• Over the past several decades, silicosis mortality has declined, from well over 1,000 deaths annually in the late 1960s to fewer than 200 per year in the mid 2000s. (Figure 3-1)

• Silicosis was designated as the underlying cause of death in over half of all silicosis deaths from 1995 to 2004. (Table 3-1)

• Silicosis deaths among U.S. residents age 15 and over represented nearly 7% of all pneumoconiosis deaths in the U.S. during the 10-year period from 1995 to 2004. (Table 6-6)

• Compared to asbestosis, CWP, and byssinosis, silicosis mortality appears to be somewhat less concentrated by geographic region or by industry. However, Pennsylvania, alone, accounts for 14% of silicosis deaths for the 1995 to 2004 period, ranking first among all states in number of silicosis deaths and fourth in age-adjusted silicosis death rates behind West Virginia, Colorado, and Utah. (Table 3-4, Table 3-5)

• For the period from 1995 to 2004, five counties (two in North Carolina and one each in West Virginia, Pennsylvania, and Missouri) had age-adjusted silicosis death rates that exceeded the national rate by more than 25-fold. (Table 3-10)

• Based on a large subset of the national data for which decedents' usual occupation and industry information was available, the *construction* and *mining* industries accounted for at least one-third of decedents with silicosis from 1990 through 1999. (Table 3-6)

• Throughout the 1995–2004 period, silicosis death rates were higher among black males than among white males. (Table 3-2)

• Based on data from the SENSOR silicosis programs in Michigan, New Jersey, and Ohio for the period from 1993–2002, approximately 7% of confirmed silicosis cases for which duration of exposure was ascertained had less than 10 years of potential occupational exposure to silica dust. (Table 3-13a, Table 3-13b)

• Data from MSHA indicate that respirable quartz exposure levels have remained relatively constant in the *coal mining* industry from 1979 to 2000 then decreased in 2001 through 2003. Levels in the *metal/nonmetal mining* industry appear to have declined from 1979 to 1987, increased substantially in 1988 when MSHA implemented a different quartz analytical standard, declined from 1989 to 1995, increased from 1996 to 1999 and remained the same thereafter. Data from OSHA indicate that respirable quartz exposure levels declined in the nonmining industries during the period 1989 to 1992 when the OSHA PEL was changed from a formula for respirable dust containing quartz to a respirable quartz concentration of 0.1 mg/m^3. (Figure 3-6a, Figure 3-6b, Table 3-16a, Table 3-16b, Table 3-20)

• For the period 1993 to 2003, the percentages of exposures greater than the PEL were approximately 23% in *coal mining*, 11% in *metal/nonmetal mining*, and 40% in other industries. (Table 3-18, Table 3-19, Table 3-20)

• For the period 1993 to 2003, *iron and steel foundries*; *construction*; *machinery, except electrical*; and *fabricated structural metal products* were the industries with at least one-third of their exposures exceeding the PEL and about half of their exposures exceeding the REL based on at least 100 samples. Coal mining, with over 100,000 samples, had nearly one-fourth of its samples exceeding the MSHA PEL (Table 3-17)

• For the period 1993 to 2003, Arizona, Indiana, Virginia, Tennessee, Southern West Virginia, and Kentucky had geometric mean respirable quartz exposure levels in the coal mining industry which exceeded 0.4 mg/m^3 MRE based on at least 10 samples analyzed by MSHA. (Table 3-18, Figure 3-7)

• For the period 1993 to 2003, 19 states had geometric mean respirable quartz exposure levels in nonmining industries which exceeded the NIOSH REL of 0.5 mg/m^3 based on at least 10 samples analyzed by OSHA. (Table 3-20, Figure 3-9)

Byssinosis and Related Exposures

• In comparison with other pneumoconioses, byssinosis deaths among U.S. residents age 15 and over remain relatively few—10 or less, annually since 1996. (Table 4-1)

• Nearly one-third of byssinosis decedents in the 1995 to 2004 period were female. (Table 4-1)

• Byssinosis was designated as the underlying cause of death in half of all byssinosis deaths from 1995 to 2004. (Table 4-1)

• Over one-half of byssinosis decedents in the period from 1995 to 2004 were residents of North Carolina, South Carolina, and Georgia. (Table 4-4)

• Only one industry— *yarn, thread, and fabric mills*—was associated with a significantly high byssinosis proportionate mortality for the 1990 to 1999 period. (Table 4-8)

• Although cotton dust exposure data are sparse, over one-fourth of the exposures measured by OSHA exceeded the REL for the period 1995 to 2003. (Table 4-12)

Unspecified/Other Pneumoconioses

• The pattern of deaths from unspecified/other pneumoconioses, which account for 10% of all pneumoconiosis deaths during the 1995–2004 period, tends to resemble coal workers' pneumoconiosis (and, less so, silicosis) mortality with respect to geographic distribution, a similar peak in 1972, and similar occupations and industries associated with high PMRs (in the 1990–1999 period). This indicates that most unspecified pneumoconiosis deaths are likely to be CWP deaths. (Figure 5-1, Figure 5-2, Table 5-1, Table 5-4, Table 5-8, Table 5-9, Table 6-6)

All Pneumoconioses and Related Exposures

• During the 10-year period from 1995 to 2004, there were more than 28,000 pneumoconiosis deaths nationwide, accounting for more than 276,000 years of potential life lost to life expectancy. (Table 6-1, Table 6-3)

• Overall pneumoconiosis mortality in the U.S. has been gradually declining over the past three decades, from a peak of more than 5,000 deaths in 1972 to 2,531 pneumoconiosis deaths in 2004. (Figure 6-1, Table 6-1)

• Pneumoconiosis was designated as the underlying cause of death in over one-third of all pneumoconiosis deaths from 1995 to 2004. (Figure 6-1¬¬)

• The pattern of all pneumoconiosis mortality is largely influenced by asbestosis, given that asbestosis deaths represent nearly half of all pneumoconiosis deaths from 1995 to 2004. Asbestosis deaths have exceeded CWP deaths since 1998. (Table 1-1, Table 2-1, Table 6-6)

• Based on a major survey of private industry employers, annual estimates for the number of new cases of pneumoconiosis over the late 1990s and early 2000s have ranged from 1,300 to 3,500 among employees. There has been no clear trend in these estimates since 1980. The highest estimated rates have been consistently associated with mining, particularly with *coal mining*. (Table 6-12, Table 6-13, Table 6-14a, Table 6-14b)

• For the overall period 1993 to 2003, industries with over 200 exposure samples and about 28% of the exposures exceeding the REL were *miscellaneous nonmetallic mineral and stone products, structural clay products, iron and steel foundries, pottery and related products,* and *coal mining*. (Table 6-16)

Malignant Mesothelioma

• There were over 15,000 malignant mesothelioma deaths among U.S. residents age 15 and over accounting for more than 200,000 years of potential life lost to life expectancy in the 1999–2004 period. (Table 7-1, Table 7-3)

• Mesothelioma was designated as the underlying cause of death in nearly 95% of all malignant mesothelioma deaths in the 1999–2004 period. (Table 7-1)

• For 1999–2004, nearly 20% of mesothelioma decedents were female. (Table 7-1)

• For 1999–2004, more than one-third of mesothelioma decedents were residents of just five states (California, Florida, New York, Pennsylvania, and Texas). (Table 7-4)

• For the period from 2000 to 2004, two counties (one each in Maine and Minnesota) had age-adjusted malignant mesothelioma death rates that exceeded the national rate by more than five-fold. (Table 7-10)

• Based on a large subset of the national data for which decedents' usual occupation and industry information was available, the *construction* industry accounted for nearly 15% of decedents with malignant mesothelioma in 1999. (Table 7-6)

• In addition to the *construction* industry, other industries associated with significantly increased mesothelioma propor-

tionate mortality in 1999 include *ship and boat building and repairing, industrial and miscellaneous chemicals, petroleum refining,* and *electric light and power.* (Table 7-8)

• Occupations associated with significantly elevated mesothelioma mortality in 1999 include *plumbers, pipefitters, and steamfitters; mechanical engineers; electricians;* and *elementary school teachers*. (Table 7-9)

Hypersensitivity Pneumonitis (HP)

• The annual number of hypersensitivity pneumonitis (HP) deaths has been generally increasing, from less than 20 per year in 1979 to over 60 in 2004. (Figure 8-1)

• HP was designated as the underlying cause of death in over 70% of all HP deaths from 1995 to 2004. (Table 8-1)

• The highest HP death rates for the 1995–2004 period are in the upper Midwest, northern Plains, Mountain, and New England states. (Figure 8-2, Table 8-5)

• For the 1995–2004 period, one county in North Carolina had an age-adjusted HP death rate that exceeded the national rate by 29-fold. (Table 8-10)

• For the 1990–1999 period, *agricultural production* industries (both *livestock* and *crops*) and the *farmers, except horticulture* occupation were associated with significantly elevated PMRs for HP. (Table 8-8, Table 8-9)

Asthma

• For the 1990–1999 period, *agriculture production, livestock* and *child day care services* were associated with the highest PMRs for asthma. Among the other top five industries with significantly elevated PMRs for asthma were *drug stores; health services, not elsewhere classified;* and *colleges and universities*. (Table 9-1)

• For the 1990–1999 period, half of the 22 occupational groups associated with significantly elevated PMRs for asthma was related to health care and education. (Table 9-2)

• Public health surveillance programs in four states (California, Massachusetts, Michigan, and New Jersey) have identified over 4,000 cases of work-related asthma for the 1993–2002 period. About 68% represented asthma caused by occupational exposure, while 20% represented preexisting asthma aggravated by occupational exposure. (Table 9-3)

• Of all the work-related asthma cases from California, Massachusetts, Michigan, and New Jersey associated with various categories of reported putative agents for 1993–2002, nearly 20% were associated with miscellaneous chemicals, 13% with mineral and inorganic dust, 12% with cleaning materials, 11% with indoor air pollutants, and 4% with exposures to polymers, among others. Within agent categories, *isocyanates* and *hydrocarbons, not otherwise specified,* had the greatest proportion of cases classified as occupational asthma, at 89% and 83%, respectively; pyrolysis products had the greatest proportion of cases classified as work-aggravated asthma, at 29%. (Figure 9-1)

• Based on national household surveys of the U.S. population in which respondents' current industry and occupation were ascertained for the 1997–2004 period, *social services, religious and membership organizations; health services, except hospitals; eating and drinking places; banking and credit agencies; elementary and secondary schools and colleges;* and *legal, engineering and other professional services* were the current industries associated with an estimated asthma prevalence that significantly exceeded the estimated 9.1% national asthma prevalence. (Table 9-14)

• Based on the survey noted above for the period 1997–2004, *health service* and *health technologist and technicians* were the current occupations associated with an estimated asthma prevalence that significantly exceeded the estimated 9.1% national asthma prevalence. (Table 9-17)

• For the period 1997–2004, the estimated asthma prevalence among females was significantly higher than the estimated asthma prevalence among males. (Table 9-15, Table 9-16, Table 9-18, Table 9-19)

• For the period 1997–2004, *health services, except hospitals* and *eating and drinking places* were the current industries associated with significantly higher estimated asthma prevalence for current smokers than the estimated 9.3% national asthma prevalence for all U.S. adult current smokers. (Table 9-8a)

• For the period 1997–2004, *health service* was the current occupation associated with significantly higher estimated asthma prevalence for current smokers than the estimated 9.3% national asthma prevalence for all U.S. adult current smokers. (Table 9-11a)

Chronic Obstructive Pulmonary Disease (COPD)

• *Coal mining* led the list of industries with significantly elevated PMRs for COPD in 1999. Two other mining industries were in the top five industries for COPD mortality, as were *trucking service* and *automotive repair and related services*. (Table 10-1)

• The top five occupations for COPD mortality in 1999 included *washing, cleaning, and pickling machine operators;*

helpers, mechanics and repairers; textile cutting machine operators; mining machine operators; and *construction trades, not elsewhere classified*. (Table 10-2)

• Based on a national household survey of the U.S. population conducted in which respondents' current industry and occupation were ascertained for the 1997–2004 period, *social services, religious and membership organizations; health services, except hospitals;* and *general merchandise stores* were the current industries associated with a significantly higher estimated COPD prevalence than the estimated 4.0% national asthma prevalence. (Table 10-9)

• Based on the survey noted above for the period 1997–2004, *other educational services; health services, except hospitals; and social services, religious and membership organizations* were the industries associated with significantly higher estimated COPD prevalence for current smokers than the estimated 6.5% national COPD prevalence for all U.S. adult current smokers. (Table 10-3)

Respiratory Conditions due to Toxic Agents

• Based on a major survey of private employers, the annual estimated number of cases of respiratory conditions due to toxic agents has decreased to approximately 14,500 for 2001, down from annual estimates of about 25,000 in the early and mid 1990s. (Table 11-1a)

• The major industry groups associated with the highest annual estimated rates of work-related respiratory conditions due to toxic agents in 2001 are *transportation equipment; transportation by air; local and interurban passenger transit;* and *health services*. The transportation equipment industry has consistently ranked in the top three industry sectors during the 1996–2001 period. (Table 11-3)

Respiratory Tuberculosis

• Among the industries associated with significantly elevated proportionate tuberculosis mortality in the 1990–1999 period were the healthcare industries (*offices and clinics of health practitioners; hospitals;* and *miscellaneous personal services*); industries also associated with significantly elevated silicosis mortality (*nonmetallic mining and quarrying, except fuel; metal mining; other primary metal industries;* and *coal mining*); *carpets and rugs; automotive services, except repair; miscellaneous repair services;* and *agricultural production, crops*. (Table 12-1, Table 3-8)

• Among the occupations associated with significantly elevated proportionate tuberculosis mortality in the 1990–1999 period were agricultural occupations (*farm workers* and *farmers, except horticulture*); occupations also associated with significantly elevated silicosis mortality (*crushing and grinding machine operators; mining machine operators; construction laborers; and laborers, except construction); sailors and deckhands; bar tenders; heating, air conditioning, and refrigeration mechanics; clinical laboratory technologists and technicians;* and *garbage collectors*. (Table 12-2; Table 3-9)

Lung Cancer

• A variety of industries and occupations associated with significantly elevated proportionate lung cancer mortality are listed in this section. (Table 13-1, Table 13-2)

Other Interstitial Pulmonary Diseases

• A variety of industries and occupations associated with significantly elevated other interstitial pulmonary diseases mortality are listed in this section. (Table 14-1, Table 14-2

Pneumonia and Influenza

• A variety of industries and occupations associated with significantly elevated pneumonia and influenza mortality are listed in this section. (Table 15-2)

Various Work-Related Respiratory Conditions

• Data from the Bureau of Labor Statistics Annual Survey and the Association of Occupational and Environmental Clinics Database, both of which include information on a wide range of work-related respiratory diseases, serve to remind readers that there is much more to work-related lung disease and other occupational respiratory diseases than they might otherwise realize. Data are presented on work-related upper airway disorders (e.g., allergic rhinitis), malignant diseases (e.g., nasal and laryngeal, as well as pulmonary and pleural), infectious diseases (e.g., influenza, pneumonia, and Legionnaires' disease), and other respiratory diseases (e.g., pneumonitis and interstitial fibrosis). (Table 16-1 to Table 16-5)

Smoking Prevalence by Occupation and Industry

• Based on data from the National Health Interview Survey for 1997–2004, estimated smoking prevalences range widely among the various industries, from 12% among *elementary and secondary schools and colleges* to over 38% among *eating and drinking places*. Similar wide-ranging smoking prevalences are seen among occupational groups, ranging from 5% in *health diagnosing* to nearly 39% in f*orestry and fishing*. (Table 16-1 to Table 16-6)

Selected Limitations

Selected Limitations

In addition to the following cautions, readers should see Appendix A for other limitations relating to specific sources of data presented in this report.

General

• In this report, every reasonable attempt has been made with the available resources to present comprehensive data on health outcomes and exposures of relevance to work-related lung diseases. The data are drawn from the major existing databases. However, other data may exist which would improve the completeness and reliability of the findings presented in this report. Readers who are aware of other data that should be considered for inclusion in future editions are encouraged to make their suggestions known (see Preface for contact information).

• Statistics in many tables and figures in this report are based on small numbers. Readers are cautioned that these can be unstable. Hence, inferences should be drawn with care, and should take the numerical basis into account.

• A decedent's or survey respondent's usual or current industry and occupation are not always indicative of the industry and occupation associated with the exposure responsible for that individual's work-related disease. Readers are therefore cautioned not to make definitive causative inferences about industries and occupations based solely on the various mortality and morbidity tables presented in this report.

Disease Data

• Work-related respiratory diseases are typically, though not always, chronic and may also have long latencies. As reflected in median ages at death presented in this report for the pneumoconioses, many affected individuals live to or even beyond average life expectancy. The fact that many affected individuals do not die as a direct result of their work-related respiratory disease led to a decision to consider all causes of death, underlying and contributing, in the development of the summary tables and figures of mortality data presented in this report. In the absence of national incidence and prevalence morbidity data specific to occupational diseases, the intent is to provide a better assessment of disease occurrence and distribution than would be possible if consideration were restricted to underlying causes of death.

• Certifying physicians typically do not list all of a decedent's diseases on the death certificate. Therefore, even though contributing causes of death are considered, the mortality data presented in this report probably underestimate the total occurrence of pneumoconioses and other diseases.

• As with any analysis based on death certificate data, there is undoubtedly some misclassification of cause of death. A treating physician may not correctly diagnose a particular disease during a patient's life or, as mentioned above, a certifying physician may fail to list a correctly diagnosed disease on the death certificate, particularly if another disease was directly responsible for the decedent's death. In addition, the diagnoses listed on the death certificate are sometimes miscoded.

• Data that depend, either directly or indirectly, on physician reporting or recording of occupational disease diagnoses can be influenced significantly by the physician's ability or willingness to suspect and evaluate a relationship between work and health. These, in turn, are influenced by evolving medical/scientific information, and by the legal, political, and social environment. Some factors may lead to increased diagnosis and recording/reporting (e.g., the Coal Mine Health and Safety Act of 1969 increasing recognition and recording of coal workers' pneumoconiosis), while other factors may reduce occupational disease recognition or reporting by physicians (e.g., long latency between a work exposure and disease development, or concern about involvement in litigation).

• Byssinosis and asthma lack the characteristic fibrosis and associated radiographic appearance commonly observed in mineral dust pneumoconioses. In addition, advanced stages of asthma and byssinosis may be difficult to distinguish from other chronic obstructive pulmonary diseases, including those due solely to cigarette smoking. For both these reasons, under-diagnosis may be more likely for byssinosis and work-related asthma than for the radiographically apparent pneumoconioses.

• Categorization of lung diseases for which mortality data are presented in this report is limited by the International Classification of Diseases (ICD) coding system used for the National Center for Health Statistics (NCHS) multiple cause-of-death data. Also, ICD-8, ICD-9, and ICD-10 disease rubrics differ somewhat for all types of pneumoconioses (see Appendix C). However, the effect of ICD changes is not substantial for most of the diseases under consideration (e.g., there is no indication of any changes in the yearly trend in national silicosis mortality related to changes in the rubrics for the ICD code related to silicosis).

• Prior to ICD-10, there was no discrete ICD code for malignant mesothelioma, a disease strongly associated with exposure to asbestos; ICD-10 coding of national death data in the United States began with 1999 deaths. Past reports in this *Work-related Lung Disease Surveillance Report* series

have presented data on mortality associated with "malignant neoplasm of the pleura," but that former ICD category lacked specificity and sensitivity for malignant mesothelioma.

• A general assumption of work-relatedness for pneumoconiosis deaths is reasonable for surveillance purposes. However, a very small proportion of pneumoconiosis decedents may have developed their disease as a result of non-occupational (e.g., avocational) exposure to pneumoconiotic agents.

• Although respiratory diseases other than the pneumoconioses can be caused by occupational exposure to respiratory hazards, it is generally unreasonable to assume an automatic occupational etiology because of the strong influence of non-occupational factors. As a result, readers will note that the types of mortality tables presented in this report differ depending on the specific disease. More comprehensive tables are presented for those diseases that are highly specific for occupational etiology, while a more limited approach is used for diseases that are less likely to be caused solely by occupational exposure.

• Individuals affected by chronic diseases with long latency have much more time to change residences prior to death than individuals affected by acute diseases with short latency. Thus, state of residence at death does not necessarily represent the location of a decedent's occupational exposure, even for a death that results directly from occupational respiratory disease.

• Readers are reminded that only about half the states provide data on usual industry and occupation of decedents which meet the National Center for Health Statistics' quality criteria for the national death data files used to develop many of the tables presented in this report (see Appendix E).

• Apparent differences in mortality rates may reflect, in part or in whole, geographical as well as temporal changes in employment patterns affecting the number of workers at risk to various respiratory hazards. Denominators used to calculate mortality rates presented in this report are based on general population estimates for the location (e.g., national, state, or county) and for the years in which the deaths occurred. The resulting rates have clear public health significance. However, as suggested by some very high proportionate mortality ratios presented in this report for specific industrial and occupational groups, national and state-specific rates typically represent a dilution of very high mortality among exposed groups of workers by very low mortality within the general population that is not significantly exposed.

• To comply with current CDC policy, population based mortality rates for this (and 2002) edition of the *Work-related Lung Disease Surveillance Report* have been adjusted to the U.S. Year 2000 Standard Population. This is a change from prior editions in which rates were adjusted to the 1940 standard population. Readers are cautioned that rates are not directly comparable with those shown in earlier editions.

• Proportionate mortality ratios (PMRs) reported in this (and 2002) edition of the *Work-Related Lung Disease Surveillance Report* are not directly comparable to those reported in earlier editions because PMRs in the current edition have been adjusted for age (in five-year categories), sex, and race, whereas PMRs in earlier editions were adjusted only for age (in 20-year categories). Readers are also reminded that, because of the lack of smoking information in the national death files, PMRs presented in this report have not been adjusted for smoking.

• Over the period covered by data presented in this report, median ages at death have generally increased for all pneumoconioses. The reader is cautioned to realize that this increase is the result of many factors, only one of which may be a general reduction of disease severity (e.g., due to enhanced diagnostic sensitivity and fewer severe cases). Another possible factor is a reduced number of younger workers at risk due to changing employment patterns. Reduced mortality from other causes of death is undoubtedly another important factor.

• Data from the Coal Workers X-Ray Surveillance Program (CWXSP) have a number of limitations. The program is restricted to currently employed miners and participation rates in many states are less than 50%. Disease prevalence estimates may be biased due to selective participation, and missing or inaccurate work history information may affect tenure calculations. Also, radiographic detection of pneumoconiosis is imperfect. Pathologic disease in some individuals may not be detected radiographically and, although rare among working populations, various non-occupational conditions may result in radiographic abnormalities consistent with pneumoconiosis.

• The main usefulness of the Bureau of Labor Statistics (BLS) Annual Survey of Injuries and Illnesses is to assess occupational injuries, because work-attribution of traumatic injuries is typically quite clear to the employers. In contrast, work-related diseases are generally under-recognized and under-reported by employers.

Exposure Data

• The reported Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) exposure data should be considered provisional and subject to revision. The samples were collected for regulatory compliance purposes, rather than for the surveillance of worker exposures, and therefore may not represent exposures typically

experienced by workers. Nonetheless, these data provide the best available national exposure information for industries in the U.S.

• MSHA and OSHA data for similar agents are presented in this report in a parallel format. The reader is cautioned that MSHA and OSHA are separate agencies with separate regulatory jurisdictions over different industries. The number of compliance samples collected by an agency depends upon many factors, including the size and nature of an industry, congressional actions, and regulatory policies.

• To identify pneumoconiotic agents included in the MSHA and OSHA data systems, the following documents were reviewed: *Documentation of TLVs® and BEIs®, 6th edition* (American Conference of Governmental Industrial Hygienists; ACGIH®); *Occupational Respiratory Diseases* (NIOSH Pub.No. 86-102); the *Pocket Guide to Chemical Hazards* (NIOSH Pub No. 97-140); and various NIOSH Criteria Documents. The resulting list of pneumoconiotic agents (see Table F-1 of Appendix F) represents those agents associated with the most prevalent types of pneumoconiosis, but is not intended to be a complete listing of all agents that may cause pneumoconiosis.

• Many of the reported geometric mean exposures include samples that could not be quantified with the sampling and analytical methods used. Rather than assume the values of these samples were zero, estimates of the sample results were used to calculate the geometric mean. The methods for estimating the sample result are described in the exposure section, and readers should keep in mind this uncertainty underlying the geometric mean concentrations presented in this report.

• Although OSHA adopted permissible exposure limits (PELs) of 0.1 mg/m^3 for quartz and 0.05 mg/m^3 for cristobalite that were enforced from March 1, 1989 through March 22, 1993, neither OSHA nor MSHA currently has a PEL specific to any form of crystalline silica. Instead, the relevant PELs are for respirable dust containing crystalline silica. These PELs take the form of formulas in which the PEL for respirable dust is reduced as the crystalline silica content of the dust increases. The PEL formulas vary with the agency and the industry, but, with all of them, the effective allowable exposure to quartz is less than or equal to 0.1 mg/m^3 and the effective allowable exposure to cristobalite is less than or equal to 0.05 mg/m^3, regardless of silica content. Thus, the percentage of OSHA samples exceeding the PEL is greater in the years when the formula PEL is applied (in this report, all years except 1989 through 1993) than it would be if a 0.1 mg/m^3 quartz or 0.05 mg/m^3 cristobalite PEL had been applied for these years. Readers should keep the preceding explanation in mind when considering data presented in this report showing apparent temporal discontinuities in the annual percentage of OSHA silica samples exceeding the PEL.

• The percentage of respirable coal mine dust samples exceeding the PEL was calculated using the MSHA PEL of 2 mg/m^3 MRE for respirable coal mine dust containing no more than 5% quartz. Because the quartz content could not be reliably identified for most of the respirable coal mine dust samples, no attempt was made to use the MSHA formula for reducing the PEL when the quartz content exceeded 5%. Thus, as presented in this report, the percentage of respirable coal mine dust samples exceeding the PEL is a lower limit, and the actual percentage exceeding the PEL is very likely higher than reported.

• In addition to samples in which quartz was identified, the respirable quartz data reported in Section 3 include MSHA samples identified as:

- nuisance dust, respirable fraction, less than 1% quartz;
- unlisted particulate, respirable fraction, less than 1% quartz; and
- respirable dust (not analyzed or below detection limit)

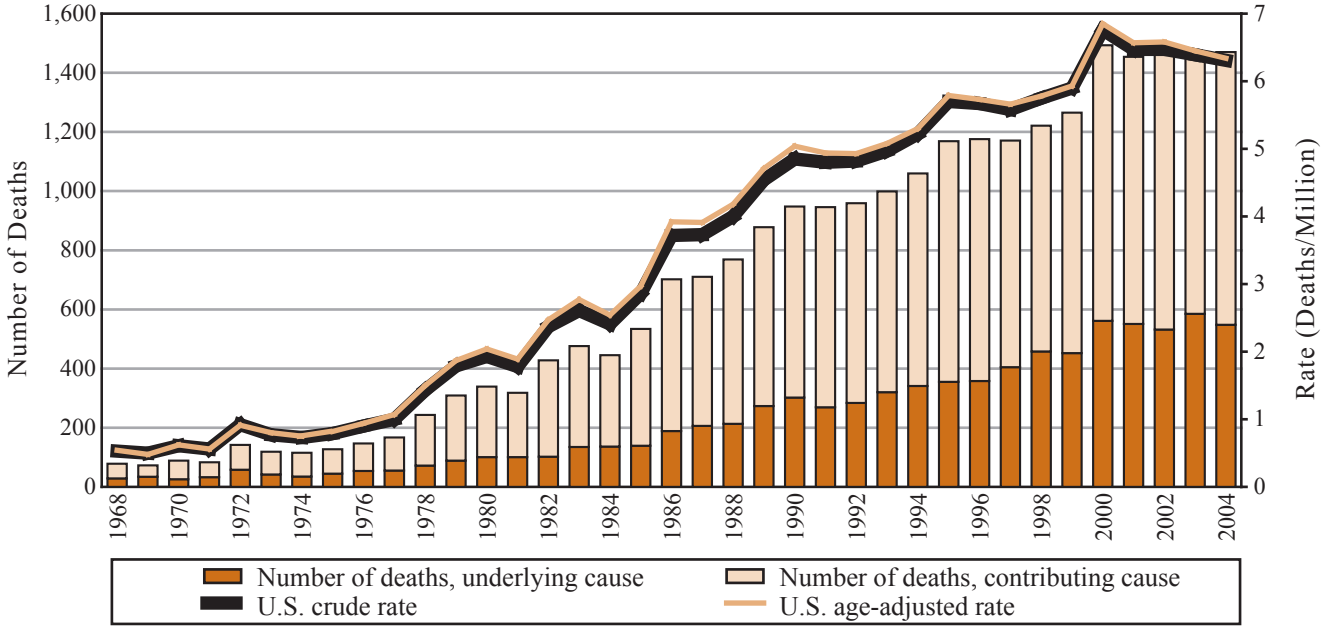
from metal/nonmetal mines because, although the samples did not indicate quartz exposure, they were collected, in part, to assess exposure to quartz. This provides a more accurate estimate of the geometric mean exposures and the percentage of exposures that exceed a PEL or recommended exposure limit (REL).

• Available exposure data for agents associated with each type of pneumoconiosis are presented in this report following the presentation of mortality data for that same condition. The reader is reminded that the time period over which the exposure data were collected does not necessarily correspond to the time period during which most of the decedents represented in the mortality data acquired their disease. For most pneumoconiosis deaths, there is a latency period of at least several years between first occupational exposure and onset of disease. Subsequent death typically occurs many years after disease onset.

Section 1

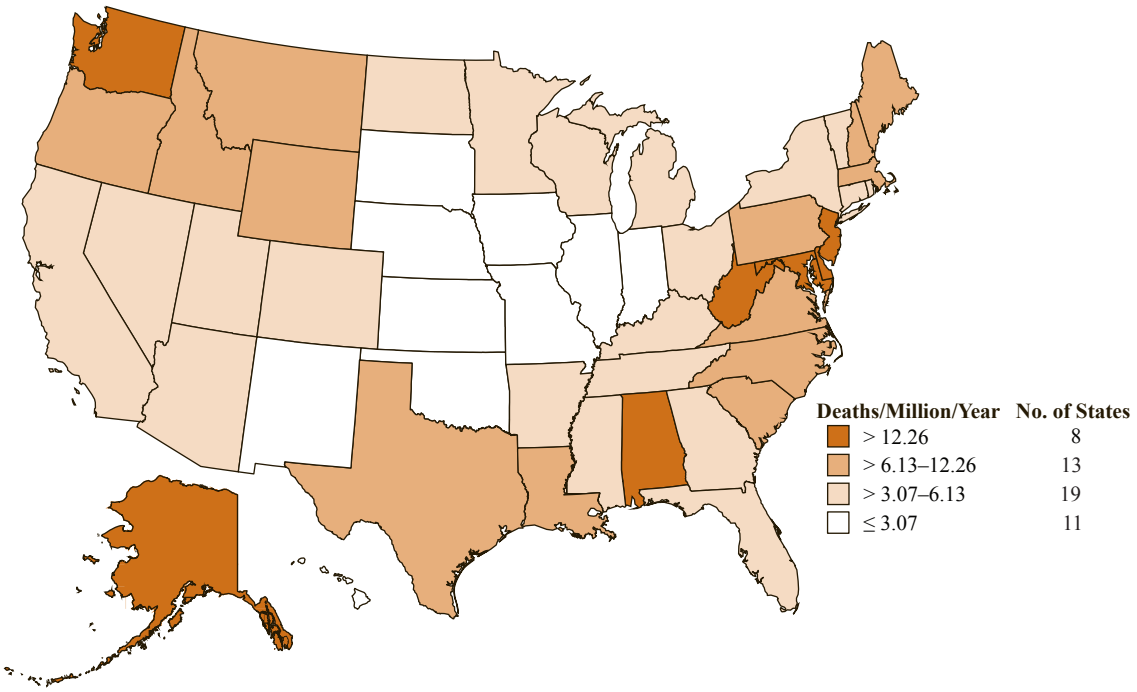
Asbestosis and Related Exposures

Figure 1-1. Asbestosis: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1968–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 1-2. Asbestosis: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 1-1. Asbestosis: Number of deaths by sex, race, and age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	1,169	30.4	1,138	31	1,095	69	5	-	-	3	24	118	411	477	136	75
1996	1,176	30.4	1,123	53	1,088	84	4	-	-	3	16	104	428	480	145	75
1997	1,171	34.6	1,128	43	1,106	60	5	-	-	-	15	95	363	516	182	77
1998	1,221	37.5	1,177	44	1,153	62	6	-	1	1	11	97	394	524	193	76
1999	1,265	35.7	1,225	40	1,190	64	11	-	-	-	15	89	390	563	208	77
2000	1,493	37.6	1,439	54	1,400	80	13	-	-	1	19	101	399	687	286	77
2001	1,454	37.9	1,412	42	1,357	85	12	-	-	1	14	124	377	675	263	77
2002	1,473	36.1	1,425	48	1,388	79	6	-	-	-	10	111	388	692	272	78
2003	1,471	39.8	1,407	64	1,379	81	11	-	-	5	16	105	352	690	303	78
2004	1,470	37.3	1,419	51	1,370	92	8	-	-	-	16	107	313	706	328	79
TOTAL	**13,363**	**36.0**	**12,893**	**470**	**12,526**	**756**	**81**	**-**	**1**	**14**	**156**	**1,051**	**3,815**	**6,010**	**2,316**	**77**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 1-2. Asbestosis: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1995	5.70	12.74	0.35	6.19	-	1.23	-
1996	5.67	12.26	0.57	7.22	0.15	0.93	-
1997	5.58	12.49	0.44	4.93	0.22	1.13	-
1998	5.75	12.94	0.45	5.09	0.15	1.09	0.20
1999	5.90	13.28	0.42	5.26	0.07	2.33	-
2000	6.73	15.04	0.55	6.28	0.14	2.35	-
2001	6.47	14.51	0.43	6.64	0.07	2.09	-
2002	6.47	14.63	0.47	5.90	0.20	1.01	-
2003	6.39	14.22	0.63	5.95	0.20	1.78	-
2004	6.31	14.11	0.49	6.74	0.13	1.10	0.15
1995–2004	**6.02**	**13.47**	**0.48**	**5.93**	**0.13**	**1.43**	**0.03**
			Age-Adjusted Death Rate				
1995	5.79	14.78	0.28	11.74	-	2.66	-
1996	5.73	14.21	0.46	12.30	0.18	1.89	-
1997	5.66	14.69	0.35	8.59	0.29	2.35	-
1998	5.78	14.89	0.36	9.08	0.19	1.87	0.36
1999	5.93	15.17	0.34	9.97	0.09	3.83	-
2000	6.85	17.84	0.45	11.89	0.17	5.13	-
2001	6.57	16.90	0.34	12.56	0.08	4.77	-
2002	6.56	16.94	0.38	11.64	0.25	2.28	-
2003	6.45	16.46	0.51	11.58	0.25	3.46	-
2004	6.34	16.26	0.38	12.98	0.14	2.16	0.25
1995–2004	**6.13**	**15.80**	**0.38**	**11.36**	**0.17**	**3.01**	**0.07**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 1-3. Asbestosis: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	930	10	55	-	30	-	1,025
1996	715	25	70	-	25	-	835
1997	660	-	40	-	-	-	700
1998	605	45	50	-	10	-	710
1999	585	10	50	-	25	-	670
2000	700	25	80	-	10	-	815
2001	685	20	145	-	5	-	855
2002	615	25	65	-	-	-	705
2003	785	40	50	5	10	-	890
2004	645	10	110	10	-	-	775
TOTAL	**6,925**	**210**	**715**	**15**	**115**	**-**	**7,980**
	Years of Potential Life Lost to Life Expectancy						
1995	11,245	351	637	-	87	-	12,320
1996	10,741	571	840	28	67	-	12,247
1997	10,652	408	582	30	54	-	11,726
1998	11,189	457	593	23	75	9	12,346
1999	11,436	407	592	14	170	-	12,619
2000	13,062	602	782	21	151	-	14,618
2001	13,118	417	898	7	133	-	14,573
2002	13,304	487	735	23	56	-	14,605
2003	13,291	693	780	47	135	-	14,946
2004	13,103	497	962	44	83	7	14,696
TOTAL	**121,141**	**4,890**	**7,401**	**237**	**1,011**	**16**	**134,696**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 1-4. Asbestosis: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	36	43	41	40	44	60	54	53	66	61	**498**
Alaska	-	2	2	5	2	3	1	4	3	2	**24**
Arizona	13	13	15	12	21	21	16	8	11	11	**141**
Arkansas	9	6	6	5	7	19	9	8	13	18	**100**
California	113	100	104	91	107	122	114	113	128	116	**1,108**
Colorado	6	13	9	6	7	10	17	12	8	20	**108**
Connecticut	13	18	13	12	15	20	18	18	22	20	**169**
Delaware	10	10	7	13	21	16	13	16	14	11	**131**
District of Columbia	-	1	-	-	-	-	3	-	-	-	**4**
Florida	67	84	61	65	95	90	81	90	80	93	**806**
Georgia	11	9	12	15	16	24	25	21	21	17	**171**
Hawaii	5	1	1	1	1	3	5	5	5	1	**28**
Idaho	4	4	4	3	7	9	6	4	7	10	**58**
Illinois	21	17	22	28	25	43	31	22	21	24	**254**
Indiana	6	7	7	11	7	9	10	9	17	12	**95**
Iowa	8	4	3	9	5	8	8	9	4	9	**67**
Kansas	10	6	6	4	4	8	10	7	3	9	**67**
Kentucky	3	9	12	10	4	12	12	14	12	15	**103**
Louisiana	18	20	21	27	19	39	31	37	37	27	**276**
Maine	8	6	8	16	15	16	12	18	10	18	**127**
Maryland	53	50	43	45	46	43	43	49	40	55	**467**
Massachusetts	40	39	43	40	37	41	34	34	35	42	**385**
Michigan	27	21	24	16	30	26	36	29	39	34	**282**
Minnesota	18	7	12	18	20	15	21	21	18	26	**176**
Mississippi	34	33	31	25	27	32	34	48	39	44	**347**
Missouri	11	11	11	13	13	19	18	17	11	12	**136**
Montana	-	4	2	6	2	7	5	14	18	18	**76**
Nebraska	4	2	5	1	6	5	7	5	3	6	**44**
Nevada	5	5	3	7	7	5	6	8	5	4	**55**
New Hampshire	6	4	7	6	6	6	5	6	5	6	**57**
New Jersey	93	109	78	93	93	88	96	84	73	68	**875**
New Mexico	8	2	1	1	4	6	8	1	2	4	**37**
New York	43	42	46	47	54	57	62	63	69	67	**550**
North Carolina	29	33	37	50	34	41	49	34	49	46	**402**
North Dakota	-	3	3	2	4	2	4	4	5	2	**29**
Ohio	35	43	43	31	45	43	56	64	58	47	**465**
Oklahoma	5	5	8	9	6	11	4	9	10	8	**75**
Oregon	18	30	21	33	31	29	26	26	39	29	**282**
Pennsylvania	114	106	112	99	77	109	84	104	86	99	**990**
Rhode Island	5	2	4	9	4	7	6	5	5	9	**56**
South Carolina	17	18	24	23	19	31	21	22	25	20	**220**
South Dakota	-	3	-	-	1	1	-	-	-	4	**9**
Tennessee	12	14	18	16	12	28	23	24	18	23	**188**
Texas	93	87	88	98	80	110	135	145	158	129	**1,123**
Utah	4	5	7	-	6	3	7	12	4	8	**56**
Vermont	2	2	1	2	2	1	2	3	-	4	**19**
Virginia	44	37	41	55	60	60	59	59	58	46	**519**
Washington	44	48	56	60	75	67	70	70	67	68	**625**
West Virginia	32	32	34	28	27	49	35	26	26	25	**314**
Wisconsin	10	3	13	13	15	13	19	19	22	20	**147**
Wyoming	2	3	1	2	-	6	3	-	2	3	**22**
TOTAL	**1,169**	**1,176**	**1,171**	**1,221**	**1,265**	**1,493**	**1,454**	**1,473**	**1,471**	**1,470**	**13,363**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 1-5. Asbestosis: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	498	9	14.10	4	13.93	5	5,902	8	11.9	9
Alaska	24	47	5.10	26	12.45	7	256	47	10.7	41
Arizona	141	26	3.55	34	3.47	38	1,536	27	10.9	36
Arkansas	100	32	4.72	27	4.33	30	1,168	32	11.7	14
California	1,108	2	4.23	29	4.92	25	12,127	2	10.9	36
Colorado	108	30	3.19	39	4.18	32	1,195	31	11.1	29
Connecticut	169	24	6.28	19	5.70	23	1,942	24	11.5	19
Delaware	131	28	20.86	2	21.23	1	1,489	28	11.4	23
District of Columbia	4	51	0.84	51	0.92	51	41	51	10.1	46
Florida	806	5	6.24	20	4.70	28	9,009	5	11.2	26
Georgia	171	23	2.68	46	3.49	37	2,038	22	11.9	9
Hawaii	28	46	2.89	43	2.83	45	374	45	13.3	1
Idaho	58	38	5.83	21	6.32	19	637	39	11.0	32
Illinois	254	19	2.61	48	2.70	46	2,927	19	11.5	19
Indiana	95	33	1.99	49	2.02	49	1,150	33	12.1	6
Iowa	67	36	2.86	44	2.45	48	741	37	11.1	29
Kansas	67	36	3.17	40	3.00	41	796	36	11.9	9
Kentucky	103	31	3.16	41	3.29	40	1,234	30	12.0	8
Louisiana	276	18	7.92	13	8.64	14	3,363	16	12.2	4
Maine	127	29	12.19	7	11.09	9	1,376	29	10.8	39
Maryland	467	10	11.19	8	12.42	8	5,454	11	11.7	14
Massachusetts	385	13	7.50	14	7.02	17	4,003	14	10.4	43
Michigan	282	16	3.61	33	3.71	35	3,239	17	11.5	19
Minnesota	176	22	4.53	28	4.65	29	1,949	23	11.1	29
Mississippi	347	14	15.64	3	16.30	3	4,465	13	12.9	2
Missouri	136	27	3.06	42	2.90	43	1,573	26	11.6	16
Montana	76	34	10.51	9	9.99	12	851	35	11.2	26
Nebraska	44	43	3.26	38	2.99	42	419	43	9.5	50
Nevada	55	42	3.53	35	4.14	33	673	38	12.2	4
New Hampshire	57	39	5.80	22	6.17	21	618	40	10.8	39
New Jersey	875	4	13.12	6	12.55	6	9,118	4	10.4	43
New Mexico	37	44	2.63	47	2.88	44	376	44	10.2	45
New York	550	7	3.63	32	3.60	36	6,139	7	11.2	26
North Carolina	402	12	6.29	18	6.69	18	4,849	12	12.1	6
North Dakota	29	45	5.60	23	4.91	26	318	46	11.0	32
Ohio	465	11	5.18	25	4.97	24	5,539	10	11.9	9
Oklahoma	75	35	2.75	45	2.66	47	920	34	12.3	3
Oregon	282	16	10.35	10	10.09	11	2,997	18	10.6	42
Pennsylvania	990	3	10.01	11	8.29	15	10,821	3	10.9	36
Rhode Island	56	40	6.61	17	5.85	22	618	40	11.0	32
South Carolina	220	20	6.86	16	7.35	16	2,561	20	11.6	16
South Dakota	9	50	1.52	50	1.27	50	83	50	9.2	51
Tennessee	188	21	4.14	30	4.31	31	2,234	21	11.9	9
Texas	1,123	1	7.04	15	8.77	13	12,975	1	11.6	16
Utah	56	40	3.38	37	4.77	27	565	42	10.1	46
Vermont	19	49	3.85	31	3.96	34	215	48	11.3	24
Virginia	519	8	9.20	12	10.56	10	5,845	9	11.3	24
Washington	625	6	13.42	5	14.78	4	6,272	6	10.0	48
West Virginia	314	15	21.20	1	18.49	2	3,608	15	11.5	19
Wisconsin	147	25	3.45	36	3.34	39	1,610	25	11.0	32
Wyoming	22	48	5.60	23	6.24	20	214	49	9.7	49

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 1-6. Asbestosis: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
060	Construction	702	24.6
360	Ship and boat building and repairing	171	6.0
192	Industrial and miscellaneous chemicals	124	4.3
400	Railroads	89	3.1
262	Miscellaneous nonmetallic mineral and stone products	75	2.6
901	General government, n.e.c.	71	2.5
270	Blast furnaces, steelworks, rolling and finishing mills	67	2.3
392	Not specified manufacturing industries	61	2.1
460	Electric light and power	55	1.9
842	Elementary and secondary schools	53	1.9
	All other industries	1,286	45.0
	Industry not reported	105	3.7
	TOTAL	**2,859**	**100.0**

CIC - Census Industry Code n.e.c. - not elsewhere classified
NOTE: The comparable number of asbestosis deaths in the entire United States for this same time period was 10,914. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 1-7. Asbestosis: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
585	Plumbers, pipefitters, and steamfitters	238	8.3
019	Managers and administrators, n.e.c.	129	4.5
575	Electricians	125	4.4
567	Carpenters	120	4.2
593	Insulation workers	108	3.8
889	Laborers, except construction	95	3.3
633	Supervisors, production occupations	85	3.0
783	Welders and cutters	78	2.7
453	Janitors and cleaners	74	2.6
804	Truck drivers	67	2.3
	All other occupations	1,638	57.3
	Occupation not reported	102	3.6
	TOTAL	**2,859**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of asbestosis deaths in the entire United States for this same time period was 10,914. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 1-8. Asbestosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
262	Miscellaneous nonmetallic mineral and stone products	75	16.4	13.0	20.7
360	Ship and boat building and repairing	171	15.7	13.5	18.3
502	Lumber and construction materials	20	7.0	4.2	10.8
192	Industrial and miscellaneous chemicals	124	4.8	4.0	5.7
211	Other rubber products, and plastics footwear and belting	40	4.3	3.1	5.9
462	Electric and gas, and other combinations	14	3.1	1.7	5.1
180	Plastics, synthetics, and resins	12	2.8	1.4	4.9
200	Petroleum refining	31	2.7	1.9	3.9
272	Primary aluminum industries	16	2.7	1.5	4.3
460	Electric light and power	55	2.7	2.0	3.5
250	Glass and glass products	30	2.6	1.7	3.7
881	Membership organizations	13	2.5	1.3	4.2
060	Construction	702	2.4	2.2	2.6
282	Fabricated structural metal products	28	2.3	1.5	3.3
420	Water transportation	24	2.3	1.5	3.4
210	Tires and inner tubes	15	2.2	1.3	3.7
400	Railroads	89	1.6	1.3	2.0
270	Blast furnaces, steelworks, rolling and finishing mills	67	1.3	1.0	1.7

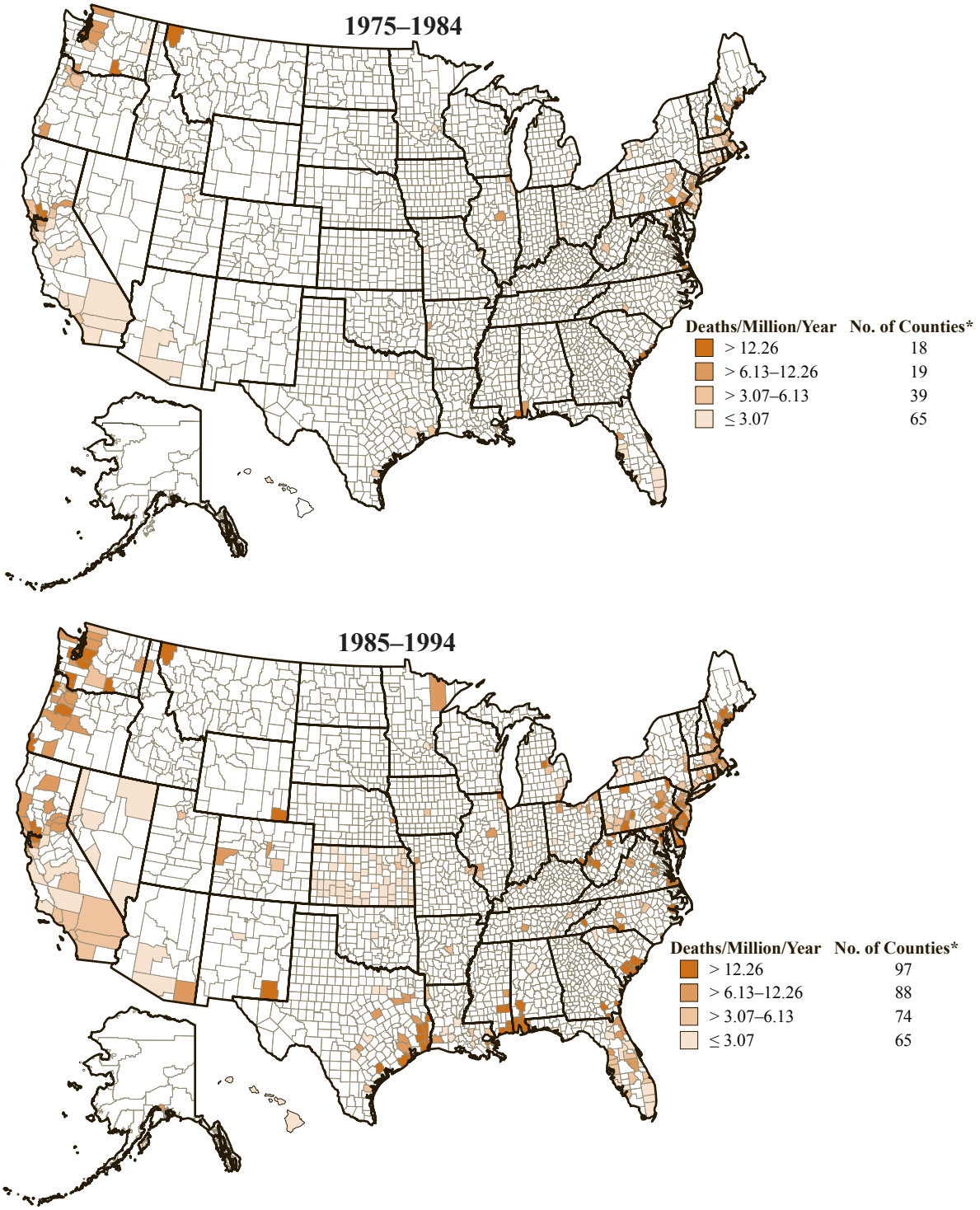
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with asbestosis reported was 2,859 in these same selected states and years, and the comparable number of asbestosis deaths in the entire United States for this same time period was 10,914. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 1-9. Asbestosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval LCL	UCL
593	Insulation workers	108	84.3	69.5	102.3
643	Boilermakers	59	20.3	15.6	26.4
585	Plumbers, pipefitters, and steamfitters	238	9.4	8.3	10.7
058	Marine and naval architects	7	8.3	3.3	17.0
646	Lay-out workers	7	8.2	3.3	16.9
584	Plasterers	9	6.4	3.0	12.2
676	Patternmakers, lay-out workers, and cutters	5	6.3	2.1	14.8
653	Sheet metal workers	53	6.1	4.7	8.1
557	Supervisors: plumbers, pipefitters, and steamfitters	7	5.3	2.1	11.0
224	Chemical technicians	8	4.9	2.1	9.6
757	Separating, filtering, and clarifying machine operators	21	4.8	2.9	7.3
829	Sailors and deckhands	12	4.2	2.2	7.4
534	Heating, air conditioning, and refrigeration mechanics	16	4.1	2.4	6.7
544	Millwrights	34	4.1	2.9	5.7
575	Electricians	125	4.1	3.4	4.9
555	Supervisors, electricians and power transmission installers	9	3.6	1.7	6.9
783	Welders and cutters	78	3.1	2.5	3.9
547	Specified mechanics and repairers, n.e.c.	21	2.6	1.6	3.9
518	Industrial machinery repairers	34	2.2	1.5	3.1
563	Brickmasons and stonemasons	26	2.1	1.4	3.1
856	Industrial truck and tractor equipment operators	17	2.1	1.2	3.4
738	Winding and twisting machine operators	11	2.1	1.0	3.7
849	Crane and tower operators	15	2.1	1.1	3.4
696	Stationary engineers	26	1.9	1.2	2.8
503	Supervisors, mechanics and repairers	17	1.9	1.1	3.0
567	Carpenters	120	1.8	1.5	2.2
507	Bus, truck, and stationary engine mechanics	16	1.8	1.0	2.9
549	Not specified mechanics and repairers	22	1.8	1.1	2.7
777	Miscellaneous machine operators, n.e.c.	38	1.6	1.2	2.2
779	Machine operators, not specified	49	1.5	1.1	2.0
633	Supervisors, production occupations	85	1.3	1.1	1.7
869	Construction laborers	58	1.3	1.0	1.7

COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with asbestosis reported was 2,859 in these same selected states and years, and the comparable number of asbestosis deaths in the entire United States for this same time period was 10,914. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 1-3a. Asbestosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1975–1984 and 1985–1994

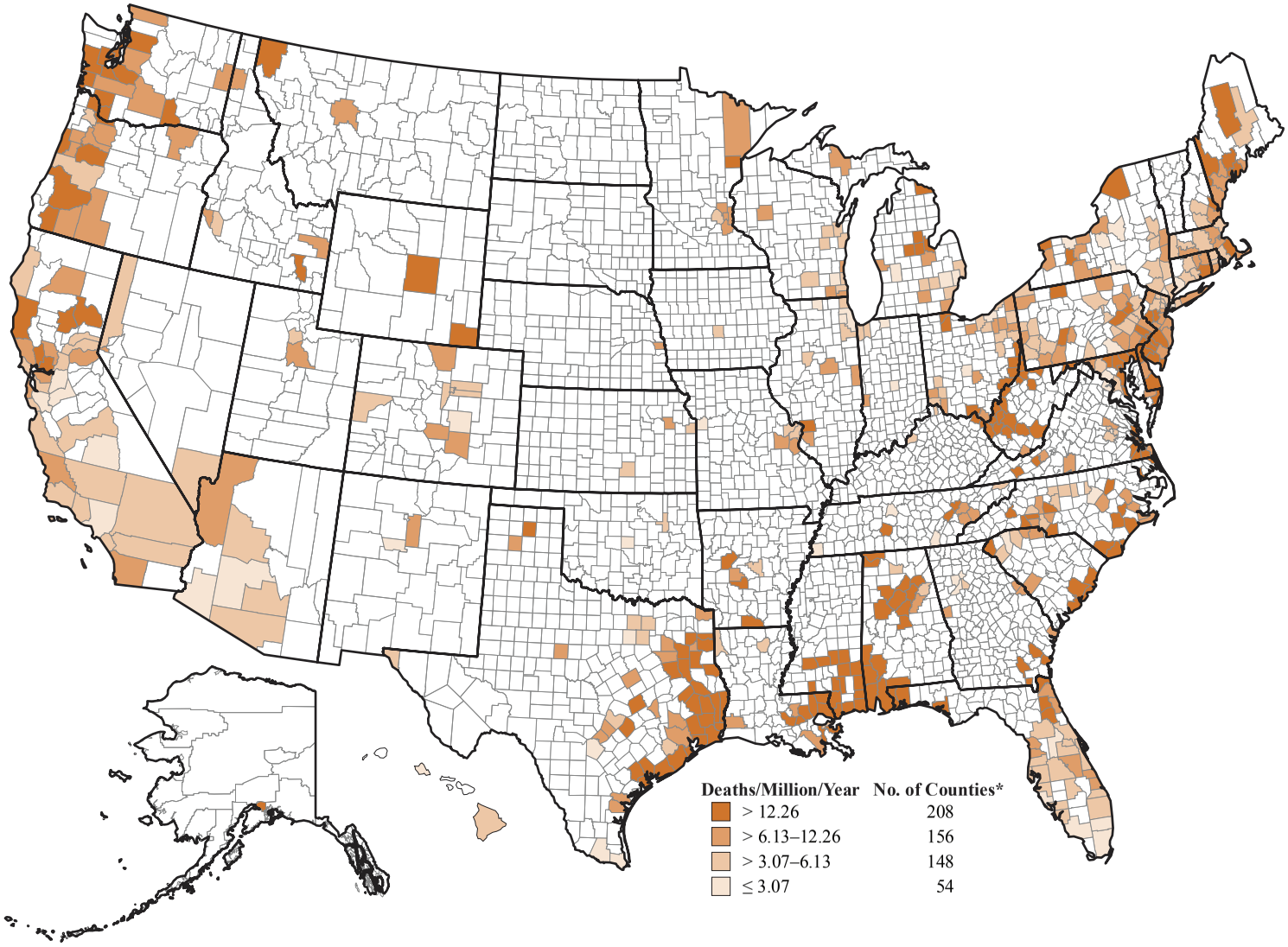


*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 1-3b. Asbestosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 1-10. Asbestosis: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 1995–2004

County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Lincoln County	Montana	262.5	289.1	44	18.2
George County	Mississippi	216.1	184.9	27	3.7
Orange County	Texas	140.5	136.6	90	3.3
Greene County	Mississippi	119.3	93.6	10	0.0
Jackson County	Mississippi	98.1	79.4	81	11.1
Poquoson City	Virginia	88.2	77.0	7	0.0
Newport News City	Virginia	84.7	68.3	94	5.3
York County	Virginia	81.6	55.7	24	0.0
Washington County	Alabama	74.7	71.9	10	0.0
Newton County	Texas	73.2	84.3	10	0.0
Tyler County	West Virginia	71.9	89.7	7	0.0
Jefferson County	Texas	71.8	76.4	151	3.3
Marion County	Texas	70.4	100.9	9	11.1
Jasper County	Texas	69.8	79.0	22	4.5
Somerset County	New Jersey	68.9	61.4	143	23.8
Kitsap County	Washington	67.7	59.2	107	4.7
Jones County	Mississippi	67.5	71.8	37	2.7
Hampton City	Virginia	67.2	53.1	62	0.0
Suffolk City	Virginia	62.1	56.9	28	3.6
Wetzel County	West Virginia	57.8	69.8	10	0.0
Carlton County	Minnesota	54.0	62.9	16	0.0
Mason County	West Virginia	53.3	61.4	13	0.0
Sagadahoc County	Maine	47.7	46.3	13	7.7
Lincoln County	West Virginia	47.5	50.2	9	0.0
Putnam County	West Virginia	47.4	38.9	16	0.0
Mobile County	Alabama	46.2	44.2	137	4.4
Hardin County	Texas	46.1	43.0	16	0.0
Berkeley County	South Carolina	44.9	26.2	29	20.7
Gloucester County	Virginia	44.7	43.8	12	0.0
Chambers County	Texas	43.7	30.1	6	0.0
Kanawha County	West Virginia	42.9	52.9	87	4.6
Hutchinson County	Texas	42.1	54.2	10	1.0
Isle of Wight County	Virginia	41.8	38.0	9	0.0
Currituck County	North Carolina	40.6	41.5	6	0.0
Salem County	New Jersey	40.0	45.3	23	4.3
Choctaw County	Alabama	38.4	39.8	5	2.0
Camden County	New Jersey	38.2	38.5	152	3.9
Colbert County	Alabama	37.7	45.1	20	5.0
Jackson County	Texas	37.6	44.6	5	0.0
Wayne County	Mississippi	37.4	37.0	6	0.0
Chesapeake City	Virginia	36.8	25.6	39	5.1
Gloucester County	New Jersey	36.6	33.1	66	1.5
Shelby County	Texas	35.3	45.8	9	0.0
Smith County	Mississippi	34.2	39.8	5	0.0
Charleston County	South Carolina	33.8	30.3	76	2.6
Portsmouth City	Virginia	33.6	38.0	30	0.0
Jasper County	Mississippi	33.3	35.4	5	2.0
Lamar County	Mississippi	33.1	26.4	8	12.5
Benton County	Washington	32.9	27.6	30	3.3
Monroe County	Ohio	32.9	40.6	5	0.0
Overall United States		**6.1**	**6.0**	**13,363**	**3.5**

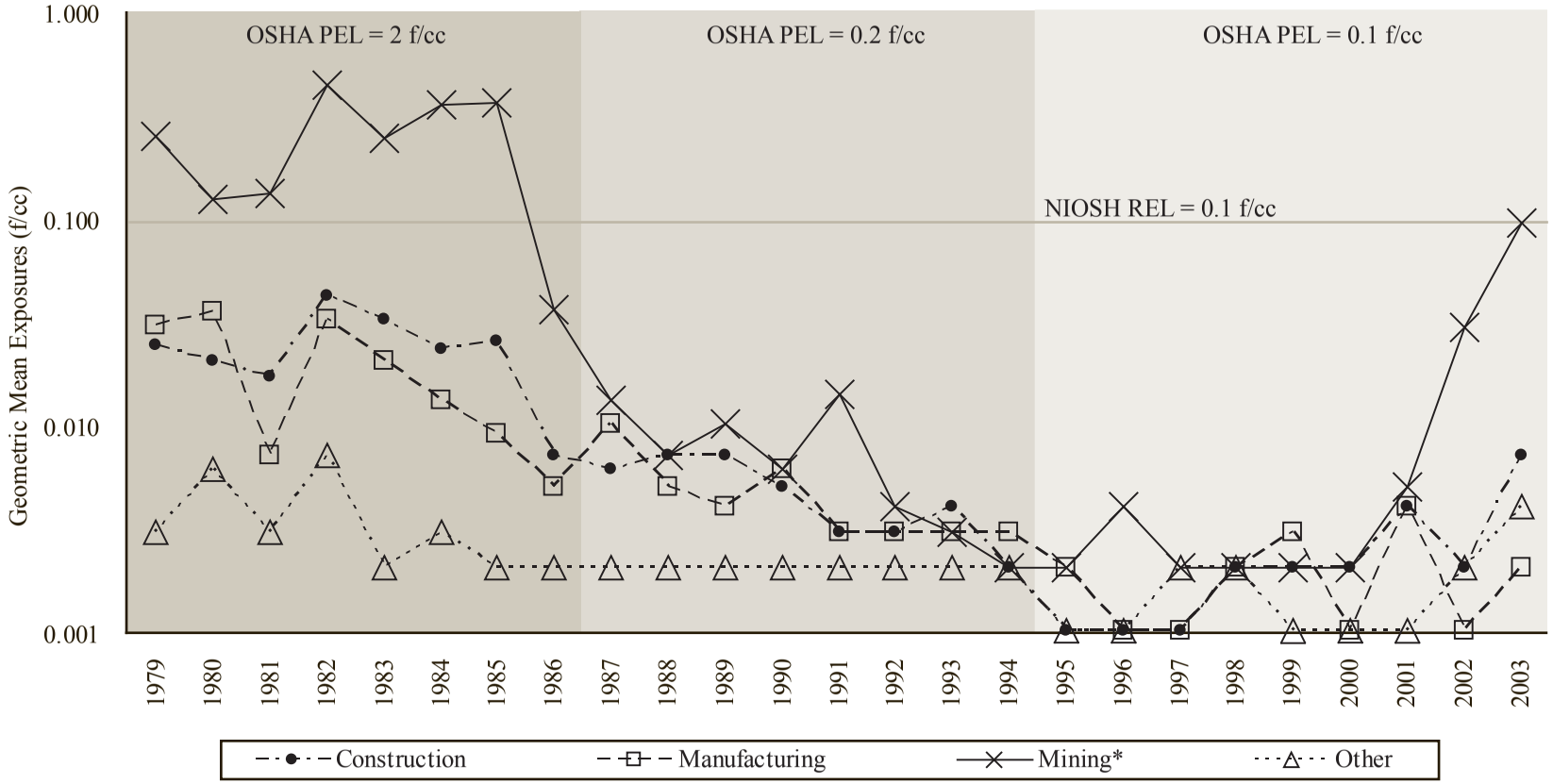
NOTE: Only counties having at least 5 deaths with the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 1-11. Asbestosis: Estimated number of discharges from short-stay non-federal hospitals, 1970–2004

Year	Number of Discharges
1970	300
1971	400
1972	100
1973	2,000
1974	1,000
1975	1,000
1976	1,000
1977	1,000
1978	3,000
1979	3,000
1980	4,000
1981	2,000
1982	2,000
1983	4,000
1984	6,000
1985	6,000
1986	6,000
1987	11,000
1988	8,000
1989	8,000
1990	5,000
1991	7,000
1992	11,000
1993	8,000
1994	10,000
1995	9,000
1996	13,000
1997	14,000
1998	15,000
1999	14,000
2000	20,000
2001	19,000
2002	22,000
2003	12,000
2004	21,000

NOTE: Number of discharges has been rounded. The National Center for Health Statistics recommends that, in statistical comparisons, estimates of less than 5,000 not be used and that estimates of 5,000 to 10,000 be used with caution. See appendices for source description and methods.
SOURCE: National Center for Health Statistics National Hospital Discharge Survey.

Figure 1-4. Asbestos: Geometric mean exposures by major industry division, MSHA and OSHA samples, 1979–2003



PEL - permissible exposure limit REL - recommended exposure limit f/cc - fibers per cubic centimeter
MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
*The MSHA PEL is 2 f/cc.
NOTE: See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.

Table 1-12. Asbestos: Geometric mean exposures and percent exceeding designated occupational exposure limits by major industry division, MSHA and OSHA samples, 1979–2003

OSHA PEL (f/cc)	Year	Construction (SIC 15–17)				Manufacturing (SIC 20–39)				Mining (SIC 10–12, 14)				Other (SIC 1–9, 13, 40–99)			
		GM (f/cc)	No. of Samples	% > PEL	% > REL	GM (f/cc)	No. of Samples	% > PEL	% > REL	GM (f/cc)	No. of Samples	% > PEL*	% > REL	GM (f/cc)	No. of Samples	% > PEL	% > REL
2.0	**1979**	0.024	97	3.1	36.1	0.030	335	3.0	37.3	0.245	204	10.8	70.6	0.003	94	0.0	7.4
	1980	0.020	172	3.5	30.2	0.035	313	7.7	41.2	0.122	301	5.6	60.8	0.006	124	0.0	13.7
	1981	0.017	112	1.8	22.3	0.007	153	0.7	14.4	0.130	276	5.4	60.9	0.003	68	0.0	2.9
	1982	0.042	168	7.7	32.1	0.032	181	1.1	35.4	0.432	64	0.0	90.6	0.007	51	0.0	9.8
	1983	0.032	383	4.2	37.9	0.020	372	4.6	27.2	0.243	73	0.0	78.1	0.002	469	0.0	1.5
	1984	0.023	622	5.1	32.6	0.013	434	2.3	26.7	0.348	23	0.0	91.3	0.003	819	0.0	2.7
	1985	0.025	464	5.2	30.2	0.009	430	2.3	20.7	0.360	43	0.0	86.0	0.002	718	0.1	2.2
	1986	0.007	276	3.3	12.7	0.005	272	2.2	9.2	0.036	37	0.0	48.6	0.002	482	0.6	1.0
0.2	**1987**	0.006	247	4.9	9.3	0.010	433	16.9	21.2	0.013	16	0.0	12.5	0.002	729	0.7	1.1
	1988	0.007	255	9.0	12.2	0.005	350	6.3	13.1	0.007	53	0.0	18.9	0.002	493	0.6	1.8
	1989	0.007	266	11.3	15.0	0.004	287	6.3	10.8	0.010	29	0.0	20.7	0.002	600	0.3	0.7
	1990	0.005	174	9.8	13.8	0.006	201	11.9	15.9	0.006	46	4.3	19.6	0.002	457	0.2	0.7
	1991	0.003	212	2.8	4.7	0.003	265	8.3	10.9	0.014	34	2.9	32.4	0.002	454	0.0	0.4
	1992	0.003	193	4.7	7.8	0.003	137	0.0	1.5	0.004	28	7.1	7.1	0.002	280	0.0	1.1
	1993	0.004	141	1.4	5.0	0.003	127	5.5	10.2	0.003	14	0.0	7.1	0.002	229	0.0	1.3
	1994	0.002	82	3.7	6.1	0.003	76	0.0	3.9	0.002	157	0.0	0.6	0.002	218	0.0	0.5
0.1	**1995**	0.001	45	2.2	2.2	0.002	111	0.9	0.9	0.002	77	0.0	0.0	0.001	144	0.7	0.7
	1996	0.001	75	0.0	0.0	0.001	149	1.3	1.3	0.004	28	0.0	10.7	0.001	167	0.6	0.6
	1997	0.001	52	0.0	0.0	0.001	49	0.0	0.0	0.002	7	0.0	0.0	0.002	133	0.0	0.0
	1998	0.002	35	0.0	0.0	0.002	33	0.0	0.0	0.002	3	0.0	0.0	0.002	93	0.0	0.0
	1999	0.002	36	11.1	11.1	0.003	18	5.6	5.6	0.002	2	0.0	0.0	0.001	74	0.0	0.0
	2000	0.002	52	3.8	3.8	0.001	50	0.0	0.0	0.002	226	0.0	0.4	0.001	108	0.0	0.0
	2001	0.004	33	6.1	6.1	0.004	28	7.1	7.1	0.005	51	0.0	3.9	0.001	58	0.0	0.0
	2002	0.002	36	2.8	2.8	0.001	24	0.0	0.0	0.029	31	0.0	29.0	0.002	45	0.0	0.0
	2003	0.007	60	20.0	20.0	0.002	9	0.0	0.0	0.094	28	0.0	75.0	0.004	38	10.5	10.5

SIC - Standard Industrial Classification PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean f/cc - fibers per cubic centimeter
MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
*MSHA PEL is 2 f/cc.
NOTE: The NIOSH REL is 0.1 f/cc. See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.

Table 1-13. Asbestos: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, MSHA and OSHA samples, 1995–2003

CIC	Industry	Number of Samples	GM (f/cc)	% > PEL	% > REL
050	Nonmetallic mining and quarrying, except fuel	322	0.004	0.0	9.9
262	Miscellaneous nonmetallic mineral and stone products	23	0.002	8.7	8.7
060	Construction	424	0.002	5.2	5.2
900	Executive and legislative offices	23	0.003	4.3	4.3
040	Metal mining	131	0.002	0.0	3.1
351	Motor vehicles and motor vehicle equipment	68	0.004	1.5	1.5
	All other industries*	1,217	0.001	0.7	0.7
	TOTAL	**2,208**	**0.002**	**1.5**	**3.2**

CIC - Census Industry Code PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean
MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
f/cc - fibers per cubic centimeter
* includes industries with no samples exceeding the REL or industries with less than 10 samples.
NOTE: The MSHA PEL is 2 f/cc. The OSHA PEL is 2 f/cc before July 21, 1986, 0.2 f/cc from July 21, 1986 to October 10, 1994, and 0.1 f/cc after October 10, 1994. The NIOSH REL is 0.1 f/cc. See appendices for source description and methods.
SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.

Table 1-14 (page 1 of 2). Asbestos: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA metal/nonmetal district and state, MSHA samples, 1979–2003

	All years		1979–1986				1987–1994				1995–2003			
MSHA Metal/Nonmetal District	No. of Samples	GM (f/cc)	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL
Northeast	**438**	**0.051**	**240**	**0.433**	**6.3**	**85.0**	**70**	**0.009**	**7.1**	**21.4**	**128**	**0.002**	**0.0**	**7.0**
Connecticut	3	0.002	0	-	-	-	0	-	-	-	3	0.002	0.0	0.0
Delaware	0	-	0	-	-	-	0	-	-	-	0	-	-	-
District of Columbia	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Maine	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Maryland	48	0.018	26	0.120	0.0	53.8	18	0.002	0.0	0.0	4	0.002	0.0	0.0
Massachusetts	1	0.002	0	-	-	-	1	0.002	0.0	0.0	0	-	-	-
New Hampshire	0	-	0	-	-	-	0	-	-	-	0	-	-	-
New Jersey	40	0.008	14	0.192	0.0	78.6	0	-	-	-	26	0.001	0.0	0.0
New York	95	0.021	34	0.441	0.0	91.2	6	0.002	0.0	0.0	55	0.004	0.0	16.4
Pennsylvania	22	0.001	0	-	-	-	12	0.002	0.0	0.0	10	0.002	0.0	0.0
Rhode Island	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Vermont	179	0.511	154	0.603	9.7	89.6	22	0.356	22.7	68.2	3	0.002	0.0	0.0
Virginia	47	0.006	12	0.244	0.0	83.3	8	0.002	0.0	0.0	27	0.001	0.0	0.0
West Virginia	3	0.002	0	-	-	-	3	0.002	0.0	0.0	0	-	-	-
Southeast	**168**	**0.019**	**71**	**0.089**	**5.6**	**42.3**	**14**	**0.002**	**0.0**	**0.0**	**83**	**0.008**	**0.0**	**2.4**
Alabama	1	0.020	0	-	-	-	1	0.020	0.0	0.0	0	-	-	-
Florida	6	0.013	6	0.013	0.0	33.3	0	-	-	-	0	-	-	-
Georgia	8	0.124	4	10.332	100.0	100.0	2	0.002	0.0	0.0	2	0.002	0.0	0.0
Kentucky	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Mississippi	0	-	0	-	-	-	0	-	-	-	0	-	-	-
North Carolina	16	0.003	0	-	-	-	0	-	-	-	16	0.003	0.0	0.0
Puerto Rico	4	0.023	0	-	-	-	0	-	-	-	4	0.023	0.0	50.0
South Carolina	133	0.021	61	0.079	0.0	39.3	11	0.002	0.0	0.0	61	0.009	0.0	0.0
Tennessee	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Virgin Islands	0	-	0	-	-	-	0	-	-	-	0	-	-	-
North Central	**435**	**0.005**	**119**	**0.075**	**0.8**	**45.4**	**172**	**0.002**	**0.0**	**1.7**	**144**	**0.002**	**0.0**	**2.8**
Illinois	11	0.038	9	0.079	0.0	55.6	2	0.002	0.0	0.0	0	-	-	-
Indiana	1	0.010	1	0.010	0.0	0.0	0	-	-	-	0	-	-	-
Iowa	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Michigan	184	0.002	2	0.002	0.0	0.0	134	0.002	0.0	0.0	48	0.002	0.0	0.0
Minnesota	214	0.015	106	0.083	0.9	46.2	34	0.005	0.0	8.8	74	0.002	0.0	5.4
Ohio	13	0.002	1	0.010	0.0	0.0	0	-	-	-	12	0.002	0.0	0.0
Wisconsin	12	0.002	0	-	-	-	2	0.002	0.0	0.0	10	0.002	0.0	0.0

See footnotes at end of table.

Table 1-14 (page 2 of 2). Asbestos: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA metal/nonmetal district and state, MSHA samples, 1979–2003

	All years		1979–1986				1987–1994				1995–2003			
MSHA Metal/Nonmetal District	No. of Samples	GM (f/cc)	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL
South Central	**320**	**0.015**	**231**	**0.035**	**1.3**	**39.0**	**47**	**0.002**	**0.0**	**2.1**	**42**	**0.001**	**0.0**	**0.0**
Arkansas	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Louisiana	45	0.002	0	-	-	-	45	0.002	0.0	2.2	0	-	-	-
Missouri	4	0.002	0	-	-	-	0	-	-	-	4	0.002	0.0	0.0
New Mexico	124	0.031	112	0.043	1.8	42.9	0	-	-	-	12	0.002	0.0	0.0
Oklahoma	27	0.033	27	0.033	0.0	40.7	0	-	-	-	0	-	-	-
Texas	120	0.014	92	0.028	1.1	33.7	2	0.002	0.0	0.0	26	0.001	0.0	0.0
Rocky Mountain	**269**	**0.204**	**225**	**0.327**	**4.9**	**87.1**	**29**	**0.008**	**0.0**	**20.7**	**15**	**0.102**	**0.0**	**80.0**
Arizona	89	0.527	89	0.527	11.2	92.1	0	-	-	-	0	-	-	-
Colorado	35	0.057	31	0.091	0.0	64.5	4	0.002	0.0	0.0	0	-	-	-
Kansas	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Montana	74	0.279	62	0.378	1.6	91.9	12	0.058	0.0	50.0	0	-	-	-
Nebraska	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Nevada	6	0.002	0	-	-	-	6	0.002	0.0	0.0	0	-	-	-
North Dakota	0	-	0	-	-	-	0	-	-	-	0	-	-	-
South Dakota	50	0.120	41	0.289	0.0	90.2	6	0.003	0.0	0.0	3	0.002	0.0	0.0
Utah	15	0.131	2	0.010	0.0	0.0	1	0.002	0.0	0.0	12	0.293	0.0	100.0
Wyoming	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Western	**221**	**0.122**	**135**	**0.392**	**14.8**	**83.0**	**45**	**0.025**	**0.0**	**37.8**	**41**	**0.014**	**0.0**	**22.0**
Alaska	0	-	0	-	-	-	0	-	-	-	0	-	-	-
California	212	0.144	128	0.519	15.6	87.5	43	0.029	0.0	39.5	41	0.014	0.0	22.0
Hawaii	1	0.002	0	-	-	-	1	0.002	0.0	0.0	0	-	-	-
Idaho	1	0.002	0	-	-	-	1	0.002	0.0	0.0	0	-	-	-
Oregon	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Washington	7	0.002	7	0.002	0.0	0.0	0	-	-	-	0	-	-	-
TOTAL	**1,851**	**0.030**	**1,021**	**0.166**	**5.3**	**67.2**	**377**	**0.004**	**1.3**	**11.1**	**453**	**0.003**	**0.0**	**7.9**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean f/cc - fibers per cubic centimeter
MSHA - Mine Safety and Health Administration
NOTE: The MSHA PEL is 2 f/cc. The NIOSH REL is 0.1 f/cc. See appendices for source description and methods.
SOURCE: MSHA metal/nonmetal mine data.

Table 1-15 (page 1 of 3). Asbestos: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	All years		1979–1986 OSHA PEL=2 f/cc				1987–1994 OSHA PEL=0.2 f/cc				1995–2003 OSHA PEL=0.1 f/cc			
OSHA Region	No. of Samples	GM (f/cc)	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL
Region 1	**1,464**	**0.006**	**828**	**0.014**	**5.1**	**27.3**	**486**	**0.002**	**3.7**	**4.9**	**150**	**0.002**	**7.3**	**7.3**
Connecticut	625	0.002	318	0.005	1.3	16.0	247	0.001	0.0	0.4	60	0.001	0.0	0.0
Maine	93	0.008	76	0.011	2.6	18.4	14	0.002	7.1	7.1	3	0.001	0.0	0.0
Massachusetts	514	0.014	285	0.032	10.2	38.6	171	0.005	7.0	9.9	58	0.006	19.0	19.0
New Hampshire	161	0.006	89	0.021	1.1	37.1	44	0.002	2.3	2.3	28	0.001	0.0	0.0
Rhode Island	70	0.033	60	0.032	10.0	30.0	9	0.062	44.4	44.4	1	0.002	0.0	0.0
Vermont	1	0.002	0	-	-	-	1	0.002	0.0	0.0	0	-	-	-
Region 2	**2,900**	**0.004**	**1,249**	**0.006**	**1.4**	**14.8**	**1,281**	**0.003**	**4.5**	**7.0**	**370**	**0.002**	**2.7**	**2.7**
New Jersey	713	0.007	374	0.010	2.7	20.6	277	0.006	15.5	21.7	62	0.002	6.5	6.5
New York	2,055	0.003	841	0.005	1.0	12.6	924	0.003	1.3	2.7	290	0.002	2.1	2.1
Puerto Rico	111	0.002	29	0.003	0.0	6.9	64	0.002	1.6	4.7	18	0.001	0.0	0.0
Virgin Islands	21	0.005	5	0.002	0.0	0.0	16	0.007	12.5	12.5	0	-	-	-
Region 3	**1,735**	**0.009**	**1,029**	**0.013**	**3.4**	**26.0**	**616**	**0.007**	**14.6**	**19.0**	**90**	**0.001**	**0.0**	**0.0**
Delaware	22	0.022	20	0.029	0.0	40.0	2	0.002	0.0	0.0	0	-	-	-
District of Columbia	128	0.003	113	0.003	0.9	10.6	15	0.001	0.0	0.0	0	-	-	-
Maryland	138	0.003	71	0.003	0.0	4.2	31	0.008	16.1	19.4	36	0.001	0.0	0.0
Pennsylvania	978	0.007	573	0.013	3.5	26.2	365	0.003	5.8	7.9	40	0.001	0.0	0.0
Virginia	351	0.040	164	0.056	7.3	45.1	186	0.031	31.2	40.9	1	0.000	0.0	0.0
West Virginia	118	0.010	88	0.012	2.3	23.9	17	0.015	35.3	35.3	13	0.001	0.0	0.0
Region 4	**2,154**	**0.004**	**714**	**0.014**	**4.1**	**24.6**	**1,055**	**0.003**	**2.1**	**4.4**	**385**	**0.002**	**2.1**	**2.1**
Alabama	183	0.008	104	0.020	6.7	28.8	69	0.002	0.0	0.0	10	0.005	10.0	10.0
Florida	274	0.003	93	0.008	3.2	14.0	157	0.002	1.9	3.8	24	0.001	0.0	0.0
Georgia	338	0.009	217	0.015	7.4	25.3	112	0.003	3.6	8.9	9	0.001	0.0	0.0
Kentucky	364	0.003	104	0.004	0.0	5.8	194	0.003	0.5	2.6	66	0.002	6.1	6.1
Mississippi	141	0.005	33	0.099	3.0	63.6	87	0.002	0.0	0.0	21	0.001	0.0	0.0
North Carolina	487	0.005	87	0.055	2.3	47.1	229	0.005	4.4	7.4	171	0.002	0.6	0.6
South Carolina	173	0.002	45	0.008	0.0	20.0	94	0.001	3.2	3.2	34	0.001	0.0	0.0
Tennessee	194	0.004	31	0.003	0.0	3.2	113	0.004	0.9	4.4	50	0.003	4.0	4.0

See footnotes at end of table.

Table 1-15 (page 2 of 3). Asbestos: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	All years		1979–1986 OSHA PEL=2 f/cc				1987–1994 OSHA PEL=0.2 f/cc				1995–2003 OSHA PEL=0.1 f/cc			
OSHA Region	No. of Samples	GM (f/cc)	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL
Region 5	**3,417**	**0.004**	**1,287**	**0.010**	**1.9**	**19.7**	**1,704**	**0.003**	**2.1**	**3.4**	**426**	**0.001**	**0.9**	**0.9**
Illinois	888	0.003	342	0.007	0.0	13.2	427	0.002	0.0	0.7	119	0.002	2.5	2.5
Indiana	462	0.006	213	0.033	4.2	41.8	152	0.001	0.0	0.7	97	0.001	0.0	0.0
Michigan	467	0.002	36	0.001	0.0	0.0	372	0.002	1.9	2.7	59	0.004	1.7	1.7
Minnesota	63	0.003	14	0.010	14.3	21.4	47	0.002	0.0	2.1	2	0.001	0.0	0.0
Ohio	905	0.005	381	0.009	0.8	18.4	434	0.004	5.5	7.8	90	0.001	0.0	0.0
Wisconsin	632	0.005	301	0.012	3.7	15.3	272	0.003	1.5	3.3	59	0.001	0.0	0.0
Region 6	**1,348**	**0.005**	**699**	**0.007**	**1.7**	**15.5**	**557**	**0.004**	**5.6**	**9.9**	**92**	**0.001**	**0.0**	**0.0**
Arkansas	260	0.005	104	0.004	3.8	12.5	143	0.006	7.0	14.0	13	0.001	0.0	0.0
Louisiana	122	0.005	69	0.006	1.4	8.7	52	0.003	1.9	1.9	1	0.001	0.0	0.0
New Mexico	43	0.001	2	0.002	0.0	0.0	27	0.002	0.0	0.0	14	0.001	0.0	0.0
Oklahoma	166	0.006	108	0.008	4.6	15.7	49	0.003	4.1	6.1	9	0.004	0.0	0.0
Texas	757	0.005	416	0.008	0.5	17.3	286	0.004	6.3	10.8	55	0.001	0.0	0.0
Region 7	**1,313**	**0.004**	**899**	**0.006**	**1.8**	**10.8**	**373**	**0.002**	**1.1**	**1.1**	**41**	**0.001**	**0.0**	**0.0**
Iowa	339	0.004	230	0.006	2.6	14.8	106	0.002	0.0	0.0	3	0.001	0.0	0.0
Kansas	245	0.009	168	0.016	2.4	19.0	63	0.003	3.2	3.2	14	0.001	0.0	0.0
Missouri	556	0.003	415	0.004	1.4	6.0	126	0.002	1.6	1.6	15	0.001	0.0	0.0
Nebraska	173	0.003	86	0.004	0.0	7.0	78	0.002	0.0	0.0	9	0.001	0.0	0.0
Region 8	**627**	**0.005**	**437**	**0.007**	**0.9**	**14.9**	**141**	**0.002**	**2.8**	**3.5**	**49**	**0.002**	**0.0**	**0.0**
Colorado	318	0.004	226	0.005	0.4	14.2	74	0.003	5.4	6.8	18	0.001	0.0	0.0
Montana	168	0.009	134	0.012	2.2	21.6	26	0.003	0.0	0.0	8	0.001	0.0	0.0
North Dakota	26	0.005	9	0.006	0.0	11.1	0	-	-	-	17	0.004	0.0	0.0
South Dakota	67	0.002	31	0.003	0.0	3.2	33	0.001	0.0	0.0	3	0.001	0.0	0.0
Utah	20	0.011	15	0.025	0.0	13.3	4	0.001	0.0	0.0	1	0.001	0.0	0.0
Wyoming	28	0.003	22	0.003	0.0	0.0	4	0.010	0.0	0.0	2	0.001	0.0	0.0

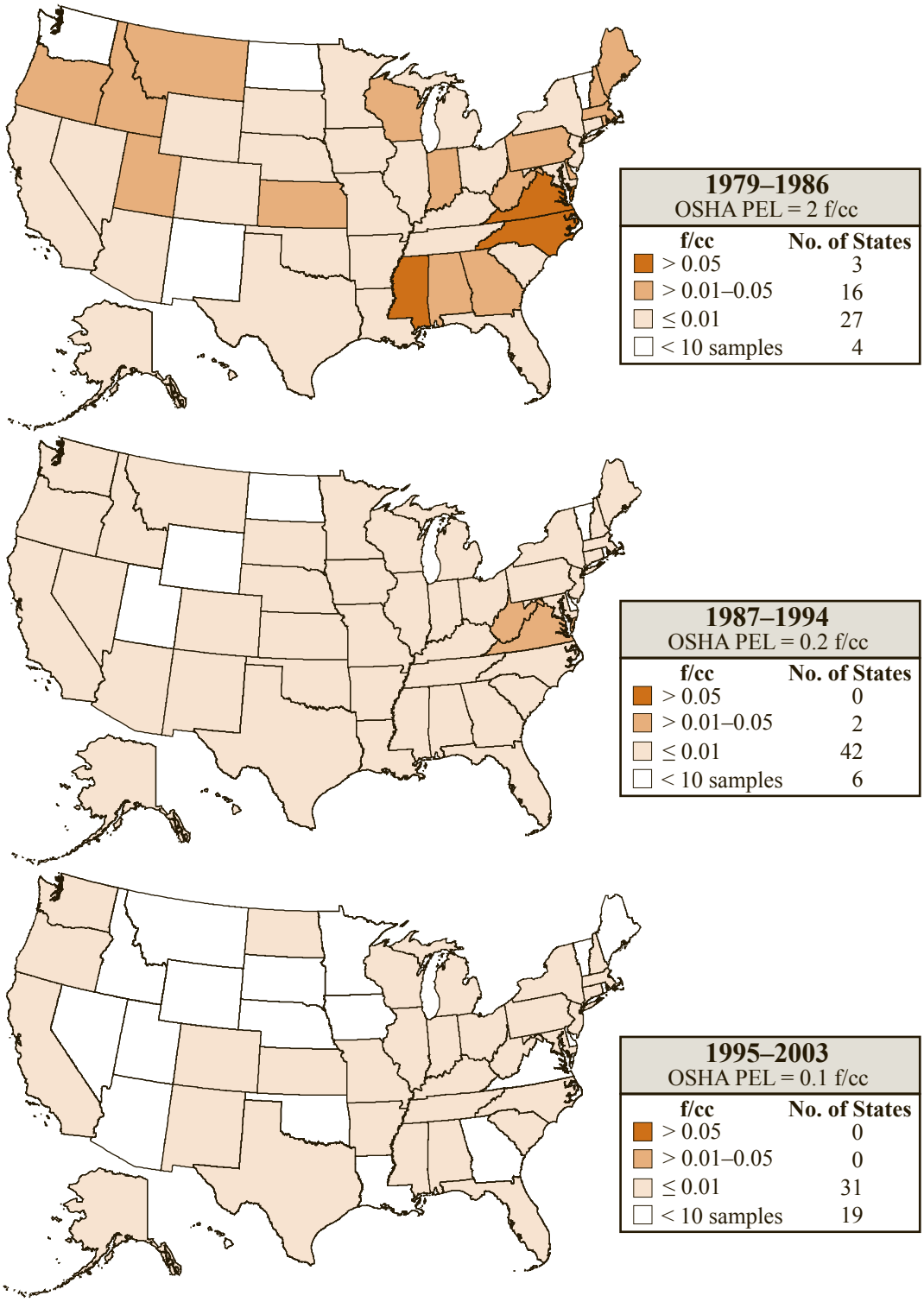
See footnotes at end of table.

Table 1-15 (page 3 of 3). Asbestos: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	All years		1979–1986 OSHA PEL=2 f/cc				1987–1994 OSHA PEL=0.2 f/cc				1995–2003 OSHA PEL=0.1 f/cc			
OSHA Region	No. of Samples	GM (f/cc)	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL	No. of Samples	GM (f/cc)	% > PEL	% > REL
Region 9	**725**	**0.002**	**178**	**0.003**	**0.6**	**9.0**	**461**	**0.002**	**3.3**	**6.3**	**86**	**0.004**	**0.0**	**0.0**
American Samoa	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Arizona	107	0.005	45	0.002	0.0	8.9	56	0.006	1.8	3.6	6	0.026	0.0	0.0
California	453	0.003	70	0.004	1.4	12.9	310	0.002	3.5	7.4	73	0.004	0.0	0.0
Guam	3	0.000	3	0.000	0.0	0.0	0	-	-	-	0	-	-	-
Hawaii	53	0.001	31	0.001	0.0	3.2	19	0.001	0.0	0.0	3	0.001	0.0	0.0
Nevada	109	0.002	29	0.004	0.0	6.9	76	0.001	3.9	5.3	4	0.003	0.0	0.0
Region 10	**587**	**0.004**	**289**	**0.007**	**2.4**	**16.3**	**232**	**0.003**	**0.9**	**3.4**	**66**	**0.002**	**1.5**	**1.5**
Alaska	220	0.003	149	0.003	1.3	2.7	50	0.004	2.0	2.0	21	0.002	0.0	0.0
Idaho	95	0.003	27	0.013	0.0	22.2	66	0.002	0.0	0.0	2	0.001	0.0	0.0
Oregon	164	0.010	107	0.013	2.8	29.9	41	0.010	0.0	9.8	16	0.003	6.3	6.3
Washington	108	0.003	6	0.385	33.3	83.3	75	0.003	1.3	4.0	27	0.001	0.0	0.0
TOTAL	**16,270**	**0.005**	**7,609**	**0.009**	**2.5**	**18.9**	**6,906**	**0.003**	**4.0**	**6.3**	**1,755**	**0.002**	**1.9**	**1.9**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean f/cc - fibers per cubic centimeter
OSHA - Occupational Safety and Health Administration
NOTE: The NIOSH REL is 0.1 f/cc. See appendices for source description and methods.
SOURCE: OSHA Integrated Management Information System.

Figure 1-5. Asbestos: Geometric mean exposures by state, OSHA samples, 1979–2003

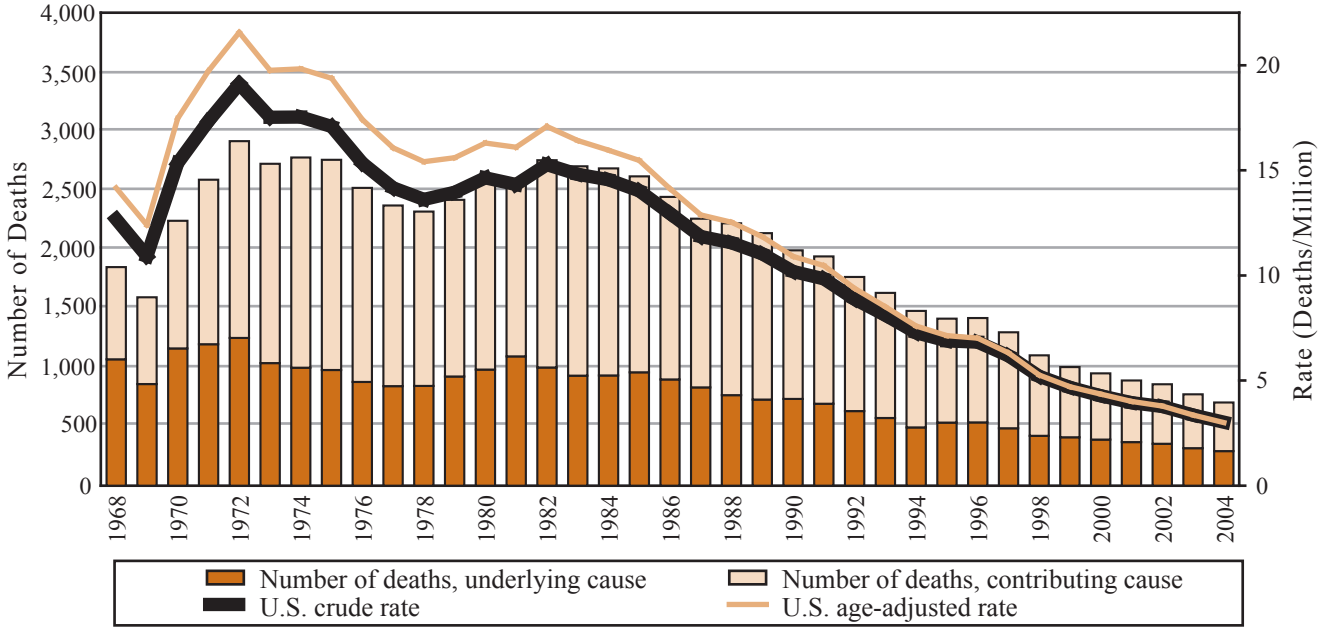


PEL - permissible exposure limit f/cc - fibers per cubic centimeter OSHA - Occupational Safety and Health Administration
NOTE: See appendices for source description, methods, and agents.
SOURCE: OSHA Integrated Management Information System.

Section 2

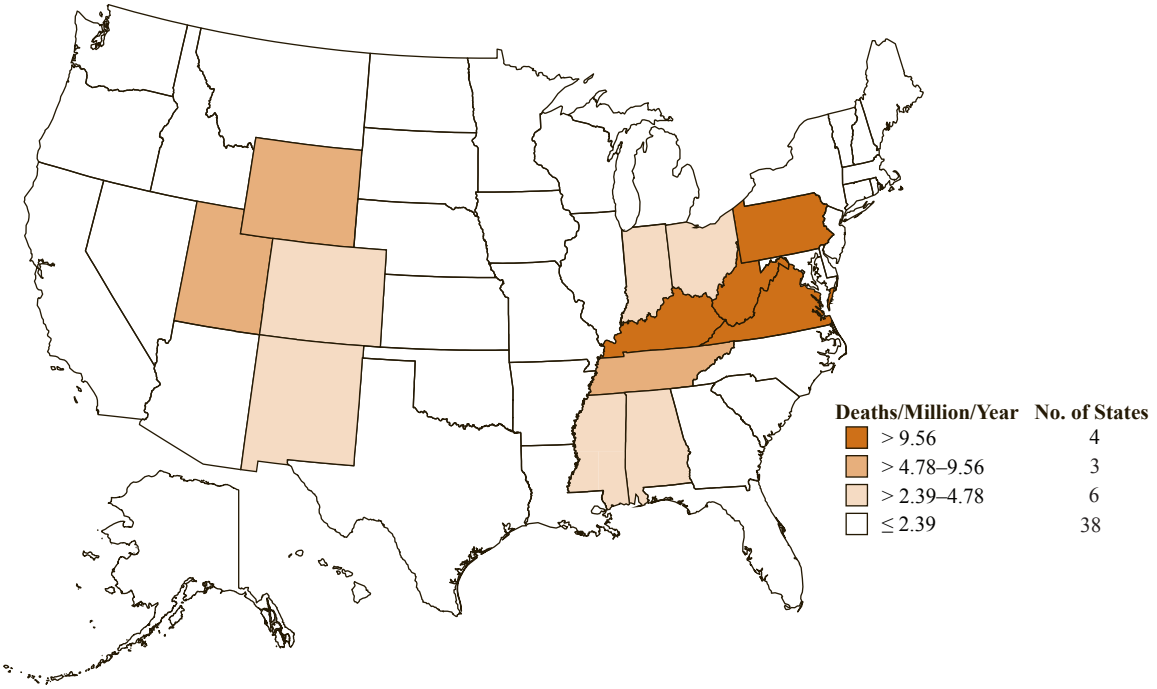
Coal Workers' Pneumoconiosis and Related Exposures

Figure 2-1. Coal workers' pneumoconiosis: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1968–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 2-2. Coal workers' pneumoconiosis: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 2-1. Coal workers' pneumoconiosis: Number of deaths by sex, race, and age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	1,413	37.7	1,407	6	1,372	41	-	-	3	4	28	75	354	614	335	79
1996	1,417	37.8	1,407	10	1,375	39	3	-	-	4	22	51	327	673	340	79
1997	1,297	37.5	1,283	14	1,267	30	-	-	2	7	24	54	266	623	321	80
1998	1,103	38.2	1,093	10	1,066	35	2	-	1	4	15	51	235	503	294	80
1999	1,003	40.9	998	5	971	31	1	-	1	3	10	52	174	459	304	81
2000	950	41.1	940	10	924	25	1	2	1	7	18	42	171	382	327	81
2001	889	41.4	878	11	865	23	1	2	-	8	19	41	159	374	286	81
2002	858	41.3	847	11	837	20	1	1	3	5	18	43	124	370	294	81
2003	773	41.1	765	8	746	26	1	1	3	4	19	48	109	341	248	81
2004	703	41.5	691	12	682	19	2	-	4	10	24	34	101	270	260	81
TOTAL	**10,406**	**39.5**	**10,309**	**97**	**10,105**	**289**	**12**	**6**	**18**	**56**	**197**	**491**	**2,020**	**4,609**	**3,009**	**80**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 2-2. Coal workers' pneumoconiosis: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	Overall	Male	Female	Male	Female	Male	Female
				Crude Death Rate			
1995	6.89	16.35	0.07	3.68	-	-	-
1996	6.83	16.15	0.10	3.43	-	0.46	0.21
1997	6.18	14.71	0.12	2.33	0.22	-	-
1998	5.20	12.31	0.09	2.89	0.07	0.22	0.20
1999	4.68	11.14	0.05	2.59	-	0.21	-
2000	4.28	10.20	0.11	2.01	-	0.18	-
2001	3.95	9.41	0.12	1.82	-	0.17	-
2002	3.77	9.01	0.10	1.47	0.07	0.17	-
2003	3.36	7.98	0.07	1.91	0.07	0.16	-
2004	3.02	7.16	0.11	1.35	0.07	0.31	-
1995–2004	**4.69**	**11.18**	**0.09**	**2.27**	**0.05**	**0.18**	**0.03**
				Age-Adjusted Death Rate			
1995	7.14	20.72	0.05	7.88	-	-	-
1996	7.02	20.30	0.09	7.25	-	1.30	0.42
1997	6.32	18.32	0.11	4.96	0.31	-	-
1998	5.26	14.98	0.07	5.96	0.09	0.49	0.40
1999	4.71	13.57	0.05	5.41	-	0.46	-
2000	4.36	12.86	0.09	4.40	-	0.43	-
2001	4.01	11.58	0.11	4.11	-	0.17	-
2002	3.79	11.00	0.10	3.19	0.08	0.38	-
2003	3.36	9.53	0.07	3.70	0.09	0.35	-
2004	3.00	8.53	0.09	3.05	0.06	0.33	-
1995–2004	**4.78**	**13.81**	**0.08**	**4.98**	**0.06**	**0.37**	**0.07**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 2-3. Coal workers' pneumoconiosis: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	960	5	35	-	-	-	1,000
1996	650	30	5	-	-	-	685
1997	815	55	5	-	-	-	875
1998	580	-	35	-	-	-	615
1999	410	50	60	-	-	-	520
2000	720	45	15	-	-	-	780
2001	625	100	30	-	25	-	780
2002	590	140	25	5	-	-	760
2003	605	125	45	-	-	-	775
2004	830	35	10	15	30	-	920
TOTAL	**6,785**	**585**	**265**	**20**	**55**	**-**	**7,710**
	Years of Potential Life Lost to Life Expectancy						
1995	12,663	66	331	-	-	-	13,060
1996	12,135	124	296	-	15	8	12,578
1997	11,389	201	208	25	-	-	11,823
1998	9,563	94	296	14	9	6	9,982
1999	8,403	126	285	-	9	-	8,823
2000	8,314	166	211	-	9	-	8,700
2001	7,878	269	196	-	39	-	8,382
2002	7,457	306	175	22	9	-	7,969
2003	7,029	235	271	10	9	-	7,554
2004	6,712	177	152	30	62	-	7,133
TOTAL	**91,543**	**1,764**	**2,421**	**101**	**161**	**14**	**96,004**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 2-4. Coal workers' pneumoconiosis: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	15	14	15	13	8	6	8	7	11	9	**106**
Alaska	-	-	-	-	1	-	-	-	-	-	**1**
Arizona	6	7	2	1	4	3	4	4	1	2	**34**
Arkansas	3	5	4	3	7	2	6	5	3	3	**41**
California	13	12	4	17	8	8	4	7	3	2	**78**
Colorado	10	7	11	8	9	10	6	9	6	7	**83**
Connecticut	1	-	-	1	1	1	2	-	-	1	**7**
Delaware	-	-	2	-	-	-	-	-	-	1	**3**
District of Columbia	1	-	-	-	-	-	-	-	1	-	**2**
Florida	21	28	23	14	16	11	12	13	17	11	**166**
Georgia	5	3	3	1	2	7	1	4	1	-	**27**
Hawaii	-	-	-	-	-	-	-	-	-	-	**-**
Idaho	-	1	2	2	1	-	-	-	-	-	**6**
Illinois	36	41	39	26	24	14	15	10	12	11	**228**
Indiana	19	16	22	22	12	11	12	11	11	5	**141**
Iowa	4	7	4	3	4	5	2	2	3	1	**35**
Kansas	6	4	1	2	1	-	1	1	-	1	**17**
Kentucky	84	129	99	90	90	69	70	71	86	75	**863**
Louisiana	1	2	2	1	1	2	2	5	5	3	**24**
Maine	-	-	-	-	-	-	-	-	-	1	**1**
Maryland	7	8	7	11	7	2	4	3	3	2	**54**
Massachusetts	-	-	-	1	-	-	-	-	-	-	**1**
Michigan	6	10	9	7	6	9	7	8	4	2	**68**
Minnesota	-	-	-	-	-	-	1	1	1	1	**4**
Mississippi	6	1	7	6	6	15	17	10	12	16	**96**
Missouri	3	1	2	2	3	3	2	1	1	2	**20**
Montana	3	2	2	-	-	1	-	-	1	-	**9**
Nebraska	-	-	1	1	-	-	1	-	-	-	**3**
Nevada	-	1	-	-	1	-	-	-	-	1	**3**
New Hampshire	-	-	1	-	-	1	1	-	-	-	**3**
New Jersey	8	8	4	5	4	2	2	1	3	3	**40**
New Mexico	5	7	5	5	4	6	2	6	5	2	**47**
New York	1	4	4	2	6	5	10	5	3	1	**41**
North Carolina	15	9	4	6	9	9	8	7	4	9	**80**
North Dakota	-	-	1	-	-	-	-	-	-	-	**1**
Ohio	71	64	41	52	31	43	31	30	24	19	**406**
Oklahoma	4	1	5	2	2	3	2	2	1	4	**26**
Oregon	1	1	1	1	1	-	-	-	2	-	**7**
Pennsylvania	592	622	550	464	409	387	348	314	294	254	**4,234**
Rhode Island	-	1	-	-	-	-	-	-	-	-	**1**
South Carolina	4	3	1	5	2	4	1	1	-	-	**21**
South Dakota	-	-	1	-	-	-	-	-	-	1	**2**
Tennessee	30	25	19	23	26	15	23	18	12	17	**208**
Texas	2	8	6	2	7	8	5	2	12	6	**58**
Utah	13	6	8	9	5	7	6	7	5	10	**76**
Vermont	1	-	-	-	-	-	-	-	-	-	**1**
Virginia	118	124	129	82	86	71	94	113	75	81	**973**
Washington	3	5	6	4	-	2	-	4	-	-	**24**
West Virginia	291	228	245	207	196	205	175	175	146	137	**2,005**
Wisconsin	1	-	3	1	1	1	2	-	3	-	**12**
Wyoming	3	2	2	1	2	2	2	1	2	2	**19**
TOTAL	**1,413**	**1,417**	**1,297**	**1,103**	**1,003**	**950**	**889**	**858**	**773**	**703**	**10,406**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 2-5. Coal workers' pneumoconiosis: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	106	10	3.00	11	3.01	12	1,055	11	10.0	25
Alaska	1	45	0.21	43	0.73	25	6	49	6.3	49
Arizona	34	24	0.86	23	0.87	23	281	28	8.3	41
Arkansas	41	20	1.94	15	1.77	15	442	21	10.8	19
California	78	14	0.30	37	0.34	36	932	13	11.9	11
Colorado	83	12	2.45	13	3.25	11	789	14	9.5	32
Connecticut	7	35	0.26	40	0.23	43	73	35	10.4	21
Delaware	3	39	0.48	30	0.50	32	30	40	9.9	26
District of Columbia	2	43	0.42	32	0.46	33	17	44	8.7	39
Florida	166	8	1.29	17	0.97	20	1,642	9	9.9	26
Georgia	27	25	0.42	32	0.55	31	303	25	11.2	15
Hawaii	-	-	-	-	-	-	-	-	-	-
Idaho	6	37	0.60	27	0.64	28	84	34	14.0	9
Illinois	228	6	2.34	14	2.39	14	2,294	7	10.1	24
Indiana	141	9	2.95	12	3.01	12	1,369	10	9.7	29
Iowa	35	23	1.49	16	1.16	19	285	27	8.2	44
Kansas	17	32	0.80	24	0.79	24	296	26	17.4	5
Kentucky	863	4	26.49	3	27.70	3	10,088	4	11.7	12
Louisiana	24	27	0.69	25	0.72	26	582	18	24.2	2
Maine	1	45	0.10	48	0.08	49	7	48	6.8	48
Maryland	54	18	1.29	17	1.47	16	518	19	9.6	30
Massachusetts	1	45	0.02	50	0.02	50	14	45	14.3	8
Michigan	68	16	0.87	22	0.90	22	705	16	10.4	21
Minnesota	4	38	0.10	48	0.11	47	67	37	16.8	6
Mississippi	96	11	4.33	9	4.43	8	3,170	6	33.0	1
Missouri	20	30	0.45	31	0.42	35	223	31	11.1	16
Montana	9	34	1.24	20	1.17	18	67	37	7.5	47
Nebraska	3	39	0.22	42	0.20	45	24	42	7.9	45
Nevada	3	39	0.19	45	0.26	41	30	40	9.9	26
New Hampshire	3	39	0.31	36	0.33	37	24	42	7.9	45
New Jersey	40	22	0.60	27	0.57	29	364	23	9.1	34
New Mexico	47	19	3.34	10	3.77	10	391	22	8.3	41
New York	41	20	0.27	39	0.27	39	465	20	11.3	14
North Carolina	80	13	1.25	19	1.39	17	760	15	9.5	32
North Dakota	1	45	0.19	45	0.17	46	9	46	8.5	40
Ohio	406	5	4.52	8	4.36	9	3,660	5	9.0	37
Oklahoma	26	26	0.95	21	0.93	21	326	24	12.5	10
Oregon	7	35	0.26	40	0.25	42	73	35	10.4	21
Pennsylvania	4,234	1	42.81	2	34.79	2	38,400	1	9.1	34
Rhode Island	1	45	0.12	47	0.09	48	6	49	6.1	50
South Carolina	21	29	0.65	26	0.71	27	234	29	11.1	16
South Dakota	2	43	0.34	35	0.33	37	48	39	23.9	3
Tennessee	208	7	4.58	7	4.84	7	2,232	8	10.7	20
Texas	58	17	0.36	34	0.43	34	1,022	12	17.6	4
Utah	76	15	4.59	6	6.53	5	685	17	9.0	37
Vermont	1	45	0.20	44	0.21	44	8	47	8.3	41
Virginia	973	3	17.24	4	19.82	4	11,191	3	11.5	13
Washington	24	27	0.52	29	0.56	30	231	30	9.6	30
West Virginia	2,005	2	135.40	1	118.37	1	21,865	2	10.9	18
Wisconsin	12	33	0.28	38	0.27	39	181	32	15.1	7
Wyoming	19	31	4.83	5	5.40	6	173	33	9.1	34

- indicates no deaths listed.

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 2-6. Coal workers' pneumoconiosis: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
041	Coal mining	3,765	77.0
060	Construction	188	3.8
270	Blast furnaces, steelworks, rolling and finishing mills	56	1.1
392	Not specified manufacturing industries	48	1.0
400	Railroads	39	0.8
010	Agricultural production, crops	35	0.7
351	Motor vehicles and motor vehicle equipment	30	0.6
410	Trucking service	29	0.6
040	Metal mining	25	0.5
961	Non-paid worker or non-worker or own home/at home	24	0.5
	All other industries	461	9.4
	Industry not reported	193	3.9
	TOTAL	**4,893**	**100.0**

CIC - Census Industry Code
NOTE: The comparable number of coal workers' pneumoconiosis deaths in the entire United States for this same time period was 15,036. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 2-7. Coal workers' pneumoconiosis: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
616	Mining machine operators	3,440	70.3
889	Laborers, except construction	147	3.0
575	Electricians	64	1.3
804	Truck drivers	63	1.3
019	Managers and administrators, n.e.c.	59	1.2
613	Supervisors, extractive occupations	49	1.0
567	Carpenters	48	1.0
453	Janitors and cleaners	47	1.0
869	Construction laborers	45	0.9
473	Farmers, except horticulture	39	0.8
844	Operating engineers	39	0.8
	All other occupations	654	13.4
	Occupation not reported	199	4.1
	TOTAL	**4,893**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of coal workers' pneumoconiosis deaths in the entire United States for this same time period was 15,036. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 2-8. Coal workers' pneumoconiosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
041	Coal mining	3,765	53.2	51.5	54.9
040	Metal mining	25	2.0	1.3	2.9

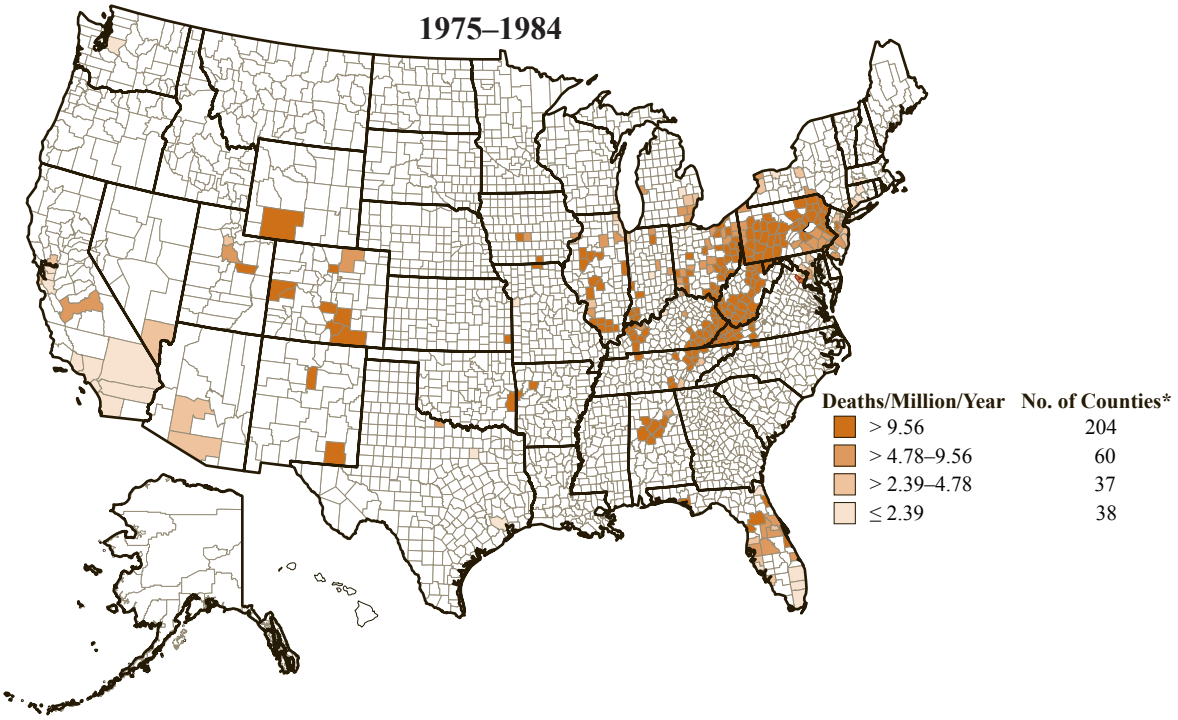
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with coal workers' pneumoconiosis reported was 4,893 in these same selected states and years, and the comparable number of coal workers' pneumoconiosis deaths in the entire United States for this same time period was 15,036. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

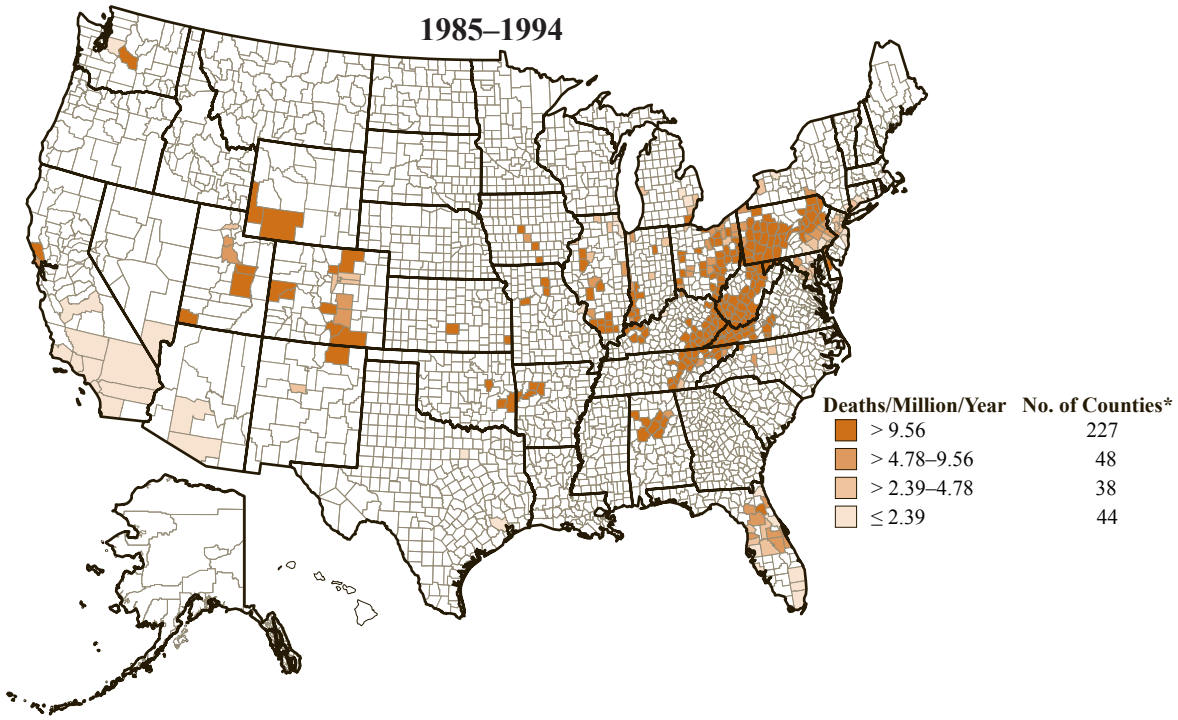
Table 2-9. Coal workers' pneumoconiosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
616	Mining machine operators	3,440	51.7	50.0	53.4
613	Supervisors, extractive occupations	49	14.4	10.6	19.0
046	Mining engineers	8	6.0	2.6	11.9
617	Mining occupations, n.e.c.	14	4.5	2.4	7.5
859	Miscellaneous material moving equipment operators	12	2.3	1.2	4.0
824	Locomotive operating occupations	23	2.0	1.3	3.1

COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE:The total number of deaths with coal workers' pneumoconiosis reported was 4,893 in these same selected states and years, and the comparable number of coal workers' pneumoconiosis deaths in the entire United States for this same time period was 15,036. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

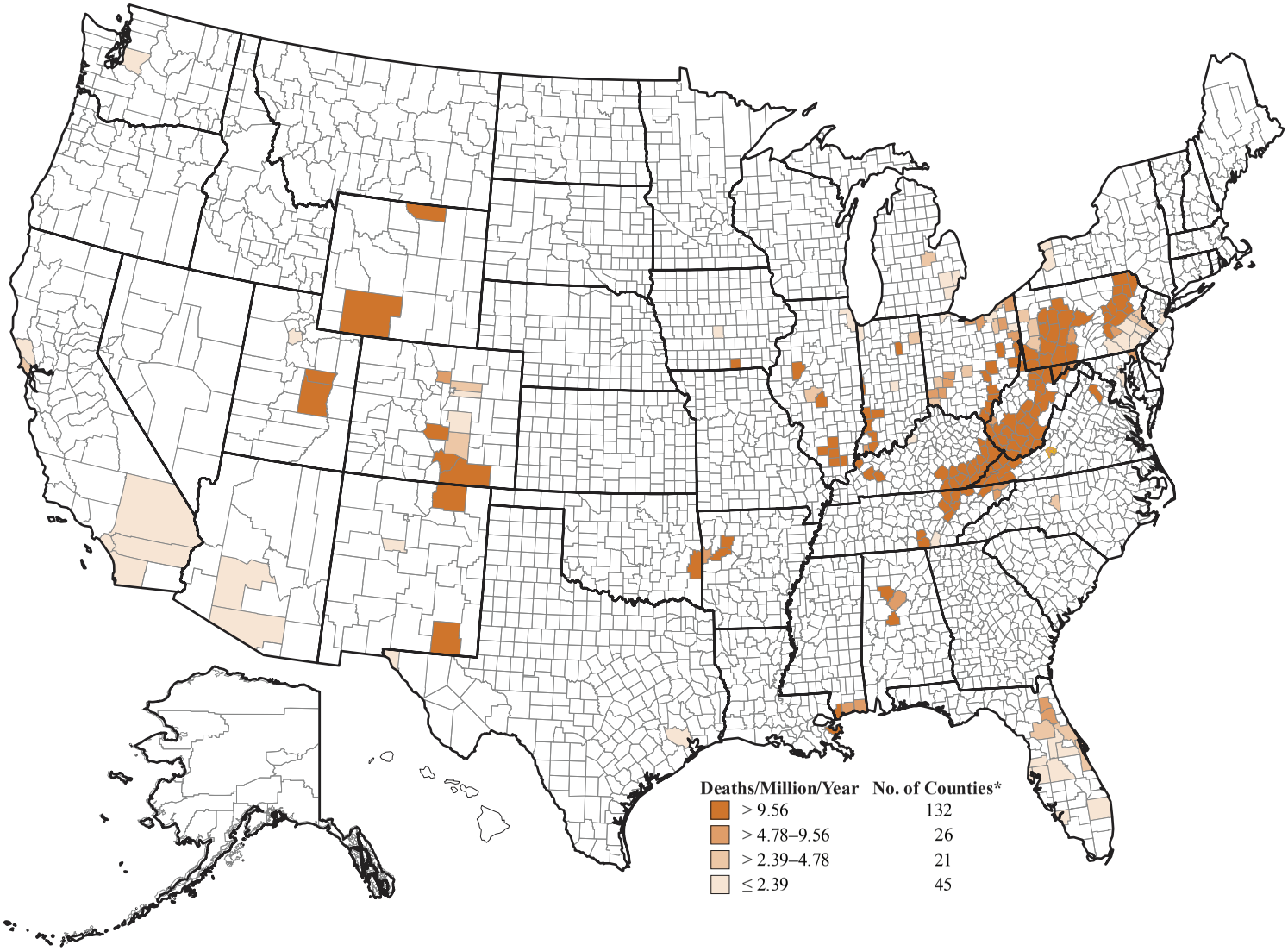
Figure 2-3a. Coal workers' pneumoconiosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1975–1984 and 1985–1994





*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 2-3b. Coal workers' pneumoconiosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 2-10. Coal workers' pneumoconiosis: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 1995–2004

County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Buchanan County	Virginia	1,351.1	1,172.4	262	0.4
McDowell County	West Virginia	863.1	1,046.1	232	0.4
Wyoming County	West Virginia	729.5	726.2	153	0.7
Raleigh County	West Virginia	619.5	701.6	458	0.0
Schuylkill County	Pennsylvania	570.6	871.5	1,089	0.1
Tazewell County	Virginia	566.1	642.4	236	0.0
Floyd County	Kentucky	488.1	440.8	153	0.0
Logan County	West Virginia	433.6	445.6	138	0.7
Mingo County	West Virginia	403.6	380.2	86	1.2
Fayette County	West Virginia	401.6	494.7	194	0.0
Lee County	Virginia	371.2	433.7	83	1.2
Wise County	Virginia	359.0	353.8	123	0.0
Harlan County	Kentucky	350.1	375.7	100	1.0
Dickenson County	Virginia	321.3	348.5	47	0.0
Leslie County	Kentucky	287.5	268.7	27	0.0
Boone County	West Virginia	287.4	294.3	61	0.0
Knott County	Kentucky	269.1	243.8	35	0.0
Perry County	Kentucky	266.7	222.7	53	0.0
Russell County	Virginia	265.9	269.3	65	0.0
Luzerne County	Pennsylvania	265.6	416.0	1,101	0.2
Pike County	Kentucky	244.0	218.0	122	0.0
Webster County	West Virginia	240.1	277.9	22	0.0
Carbon County	Utah	232.4	253.7	40	0.0
Letcher County	Kentucky	231.7	217.4	45	0.0
Northumberland County	Pennsylvania	228.1	334.1	261	0.0
Mercer County	West Virginia	225.2	293.3	153	0.7
Martin County	Kentucky	215.6	172.5	17	0.0
Hancock County	Mississippi	210.1	212.5	73	21.9
Johnson County	Kentucky	204.4	194.3	37	0.0
Cambria County	Pennsylvania	185.9	278.1	352	0.3
Emery County	Utah	184.5	152.3	12	0.0
Nicholas County	West Virginia	183.7	203.6	44	2.3
Somerset County	Pennsylvania	174.7	244.9	161	0.0
Franklin County	Illinois	166.4	249.1	79	0.0
Greenbrier County	West Virginia	165.4	218.5	62	0.0
Bell County	Kentucky	150.5	156.3	38	0.0
Colfax County	New Mexico	143.6	191.9	22	0.0
Clay County	Kentucky	142.9	116.4	23	0.0
Norton City	Virginia	136.3	156.7	5	0.0
Huerfano County	Colorado	135.9	183.7	12	0.0
Carbon County	Pennsylvania	134.6	188.0	91	0.0
Fayette County	Pennsylvania	132.4	186.7	226	0.0
Preston County	West Virginia	129.1	146.6	35	0.0
Greene County	Pennsylvania	129.0	152.5	51	0.0
Clay County	West Virginia	125.5	134.0	11	0.0
Lincoln County	West Virginia	118.0	111.5	20	0.0
Muhlenberg County	Kentucky	114.3	133.6	35	0.0
Lackawanna County	Pennsylvania	109.9	175.7	308	0.0
Campbell County	Tennessee	99.9	108.0	35	0.0
Perry County	Ohio	97.1	91.5	24	0.0
Overall United States		**4.8**	**4.7**	**10,406**	**0.9**

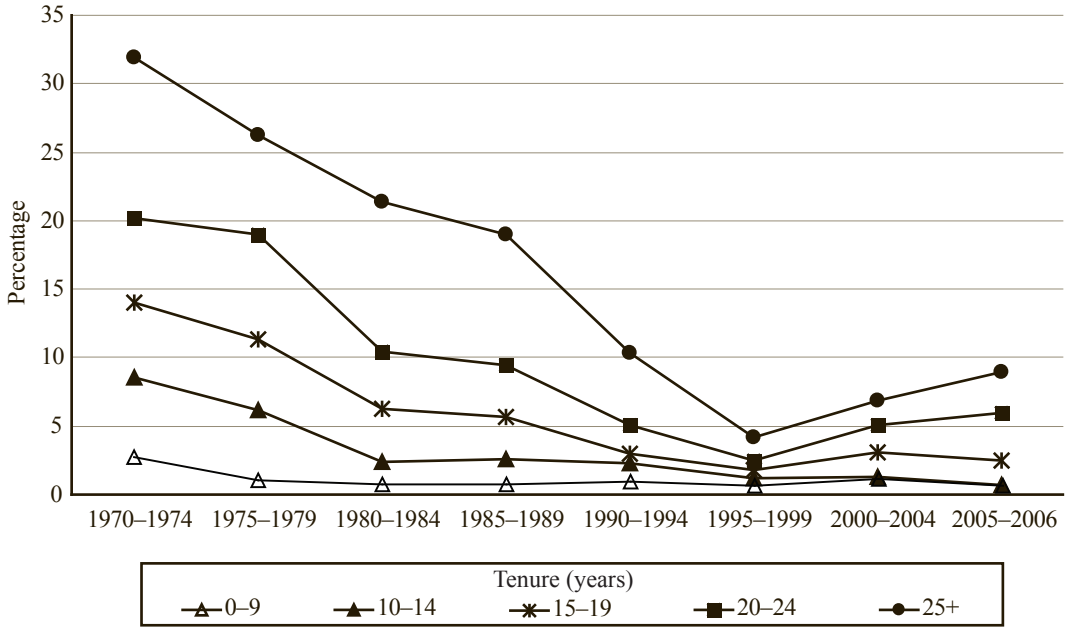
NOTE: Only counties with at least 5 deaths from the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 2-11. Coal workers' pneumoconiosis: Estimated number of discharges from short-stay non-federal hospitals, 1970–2004

Year	Number of Discharges
1970	6,000
1971	8,000
1972	11,000
1973	13,000
1974	14,000
1975	17,000
1976	18,000
1977	18,000
1978	13,000
1979	18,000
1980	17,000
1981	14,000
1982	17,000
1983	22,000
1984	23,000
1985	18,000
1986	16,000
1987	17,000
1988	15,000
1989	11,000
1990	7,000
1991	11,000
1992	10,000
1993	8,000
1994	9,000
1995	16,000
1996	11,000
1997	15,000
1998	8,000
1999	8,000
2000	10,000
2001	6,000
2002	9,000
2003	7,000
2004	5,000

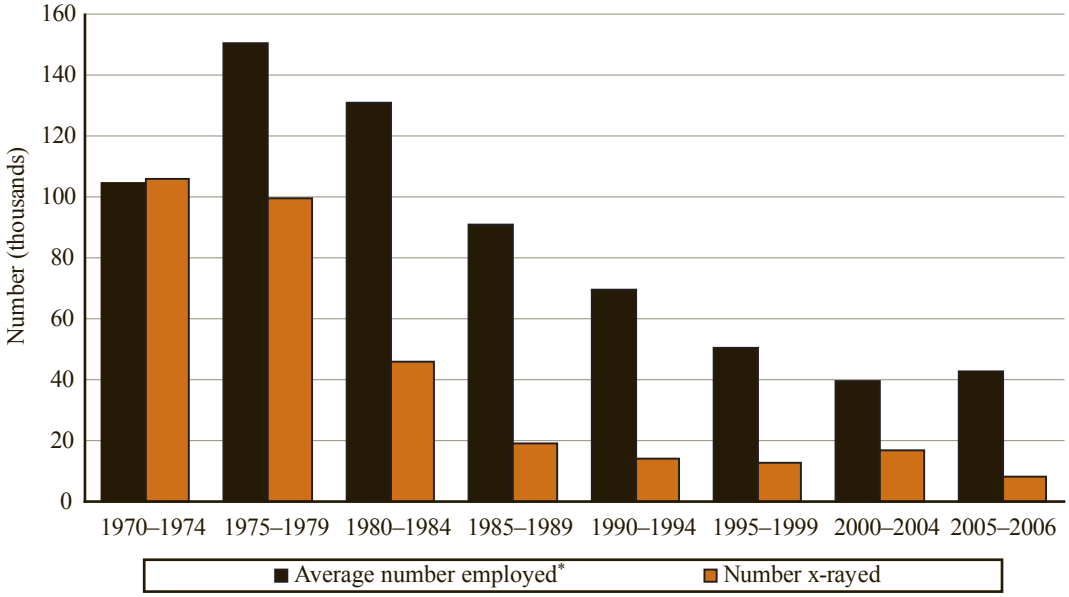
NOTE: Number of discharges has been rounded. The National Center for Health Statistics recommends that, in statistical comparisons, estimates of less than 5,000 not be used and that estimates of 5,000 to 10,000 be used with caution. See appendices for source description and methods.
SOURCE: National Center for Health Statistics National Hospital Discharge Survey.

Figure 2-4. CWXSP: Percentage of examined miners with coal workers' pneumoconiosis (category 1/0+) by tenure in mining, 1970–2006



NOTE: See appendices for source description and methods.
SOURCE: NIOSH Coal Workers' X-ray Surveillance Program (CWXSP).

Figure 2-5. CWXSP: Estimated number of actively employed workers at underground mines and number of miners examined, 1970–2006



* Average number employed during the period, based upon quarterly reports by coal mine operators to the Mine Safety and Health Administration (MSHA). Because of hiring and layoffs, the total number of individuals who worked at underground mines in any period exceeds the average employment.
NOTE: See appendices for source description and methods.
SOURCE: NIOSH Coal Workers' X-ray Surveillance Program (CWXSP). MSHA coal mine employment data.

Table 2-12. CWXSP: Number and percentage of examined employees at underground coal mines with coal workers' pneumoconiosis (ILO category 1/0+) by tenure, 1970–2006

	Tenure (years in mining)								
	0–4	5–9	10–14	15–19	20–24	25–29	30+	Unknown	Total
1970–1974									
Number of Miners Examined	26,850	11,123	6,125	5,665	7,621	8,345	16,208	23,904	105,841
Number with CWP	682	391	526	792	1,542	2,120	5,709	85	11,847
% with CWP	2.5	3.5	8.6	14.0	20.2	25.4	35.2	0.4	11.2
1975–1979									
Number of Miners Examined	28,146	15,417	5,386	2,657	2,018	1,771	3,471	40,744	99,610
Number with CWP	173	317	333	301	383	404	971	148	3,030
% with CWP	0.6	2.1	6.2	11.3	19.0	22.8	28.0	0.4	3.0
1980–1984									
Number of Miners Examined	10,638	12,591	7,009	2,215	979	724	1,555	10,086	45,797
Number with CWP	68	120	167	138	102	126	361	80	1,162
% with CWP	0.6	1.0	2.4	6.2	10.4	17.4	23.2	0.8	2.5
1985–1989									
Number of Miners Examined	2,047	3,886	4,341	2,065	680	257	390	5,383	19,049
Number with CWP	5	42	112	118	64	43	80	193	657
% with CWP	0.2	1.1	2.6	5.7	9.4	16.7	20.5	3.6	3.5
1990–1994									
Number of Miners Examined	1,693	1,288	2,937	3,992	2,305	585	307	1,176	14,283
Number with CWP	17	13	67	119	118	49	43	6	432
% with CWP	1.0	1.0	2.3	3.0	5.1	8.4	14.0	0.5	3.0
1995–1999									
Number of Miners Examined	1,444	858	1,167	2,338	3,437	1,858	515	1,057	12,674
Number with CWP	10	5	14	41	86	64	35	4	259
% with CWP	0.7	0.6	1.2	1.8	2.5	3.4	6.8	0.4	2.0
2000–2004									
Number of Miners Examined	3,134	1,124	1,205	1,408	3,084	3,219	1,475	1,995	16,644
Number with CWP	39	10	16	43	155	184	139	15	601
% with CWP	1.2	0.9	1.3	3.1	5.0	5.7	9.4	0.8	3.6
2005–2006									
Number of Miners Examined	2,151	577	442	436	603	975	1,217	1,800	8,201
Number with CWP	14	4	3	11	36	77	120	5	270
% with CWP	0.7	0.7	0.7	2.5	6.0	7.9	9.9	0.3	3.3

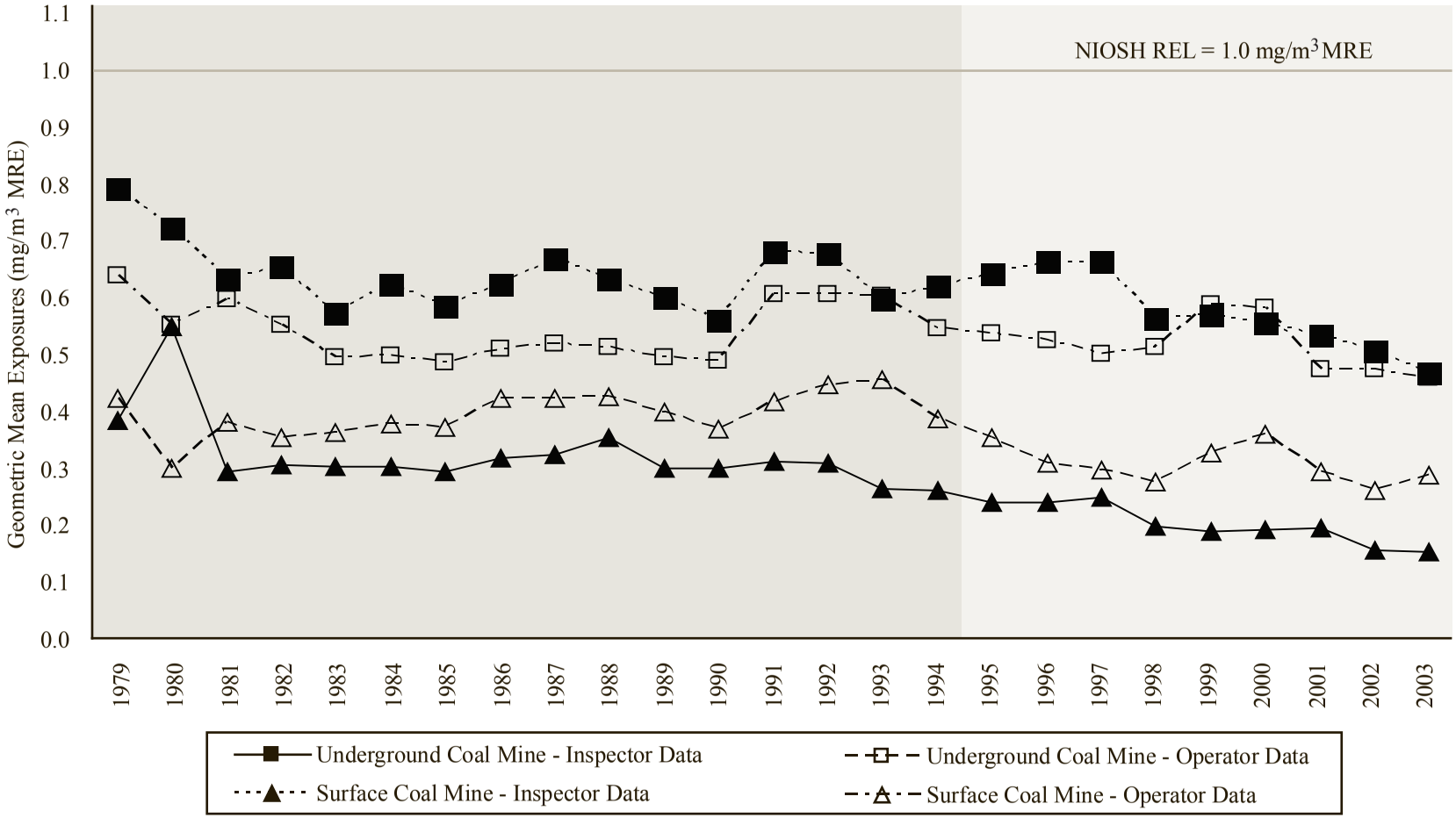
CWP - coal workers' pneumoconiosis ILO - International Labour Organization
NOTE: Tabulations are based on final determinations of one chest x-ray per period for each participating miner. See appendices for source description and methods.
SOURCE: NIOSH Coal Workers' X-ray Surveillance Program (CWXSP).

Table 2-13. Federal Black Lung Program: Number of beneficiaries and total payments by the Social Security Administration and Department of Labor, 1980–2005

	Social Security Administration (SSA)		Department of Labor (DOL)		All	
Year	Beneficiaries	Amount (dollars)	Beneficiaries	Amount (dollars)	Beneficiaries	Amount (dollars)
1980	399,477	1,032,000,000	139,073	813,205,000	538,550	1,845,205,000
1981	376,505	1,081,300,000	163,401	805,627,000	539,906	1,886,927,000
1982	354,569	1,076,000,000	173,972	784,085,000	528,541	1,860,085,000
1983	333,358	1,055,800,000	166,043	858,854,000	499,401	1,914,654,000
1984	313,822	1,038,000,000	163,166	873,932,000	476,988	1,911,932,000
1985	294,846	1,025,000,000	160,441	905,517,000	455,287	1,930,517,000
1986	275,783	971,000,000	156,892	629,075,000	432,675	1,600,075,000
1987	258,988	940,000,000	153,769	655,290,000	412,757	1,595,290,000
1988	241,626	904,000,000	150,123	656,689,000	391,749	1,560,689,000
1989	225,764	882,000,000	145,289	650,123,000	371,053	1,532,123,000
1990	210,678	863,400,000	139,854	626,521,000	350,532	1,489,921,000
1991	196,419	844,400,000	134,205	942,428,000	330,624	1,786,828,000
1992	182,396	822,500,000	128,761	973,636,000	311,157	1,796,136,000
1993	168,365	794,300,000	123,213	984,666,000	291,578	1,778,966,000
1994	155,122	751,900,000	117,569	994,655,000	272,691	1,746,555,000
1995	143,011	696,700,000	111,769	995,722,000	254,780	1,692,422,000
1996	131,143	654,600,000	105,923	992,128,000	237,066	1,646,728,000
1997	119,233	614,888,000	100,352	1,004,672,000	219,585	1,619,560,000
1998	109,271	576,389,000	94,488	999,822,000	203,759	1,576,211,000
1999	98,977	541,200,000	88,716	1,005,246,000	187,693	1,546,446,000
2000	91,596	522,147,000	82,910	422,656,000	174,506	944,803,000
2001	79,518	487,420,000	70,530	396,928,000	150,048	884,348,000
2002	73,593	453,862,000	65,747	384,234,000	139,340	838,096,000
2003	65,638	416,971,000	61,162	370,389,000	126,800	787,360,000
2004	58,598	379,829,000	56,719	346,864,000	115,317	726,693,000
2005	51,972	345,476,000	52,531	329,863,000	104,503	675,339,000

NOTE: The SSA was assigned initial responsibility for administering the Black Lung benefits program. The DOL assumed responsibility for processing and paying claims on July 1, 1973. Most claims filed prior to July 1, 1973 remain within the jurisdiction of SSA, which also continues to be responsible for processing and paying claims filed by the survivors of these miners. The dollar amounts from the DOL are for fiscal years. See appendices for source description.
SOURCE: Social Security Bulletin Annual Statistical Supplement (annual reports) and Black Lung Benefits Act Annual Report to Congress (annual reports).

Figure 2-6. Respirable coal mine dust: Geometric mean exposures by type of mine, MSHA inspector and mine operator samples, 1979–2003



PEL - permissible exposure limit REL - recommended exposure limit mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment
MSHA - Mine Safety and Health Administration
NOTE: In coal mining, for respirable dust containing less than or equal to 5% quartz, the MSHA PEL is 2 mg/m^3 MRE; for respirable dust containing greater than 5% quartz, the MSHA PEL is [(10 mg/m^3 MRE) / (% quartz)]. The NIOSH REL of 1 mg/m^3 MRE for respirable coal mine dust was adopted in September of 1995. Geometric means are reported in MRE equivalent. See appendices for source description, methods, and agents.
SOURCE: MSHA coal mine inspector and mine operator dust data.

Table 2-14. Respirable coal mine dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by type of mine, MSHA inspector and mine operator samples, 1979–2003

NIOSH REL mg/m³ MRE	Year	Underground Coal Mine Inspector Samples				Underground Coal Mine Operator Samples				Surface Coal Mine Inspector Samples				Surface Coal Mine Operator Samples			
		GM (mg/m³)	No. of Samples	% > PEL	% > REL	GM (mg/m³)	No. of Samples	% > PEL	% > REL	GM (mg/m³)	No. of Samples	% > PEL	% > REL	GM (mg/m³)	No. of Samples	% > PEL	% > REL
No REL	1979	0.796	2,349	18.7	-	0.640	204,632	17.0	-	0.384	20	5.0	-	0.424	429	7.9	-
	1980	0.728	16,591	14.6	-	0.554	237,484	15.5	-	0.551	112	17.0	-	0.299	394	5.3	-
	1981	0.635	17,459	11.3	-	0.599	39,767	14.3	-	0.292	12,238	3.5	-	0.381	8,300	5.2	-
	1982	0.657	17,905	10.4	-	0.554	88,599	12.4	-	0.304	9,075	3.7	-	0.351	18,071	4.9	-
	1983	0.575	17,973	9.5	-	0.496	91,520	10.2	-	0.300	8,299	4.5	-	0.363	13,619	5.8	-
	1984	0.625	17,873	11.4	-	0.499	95,560	10.1	-	0.302	8,344	5.2	-	0.376	12,660	5.6	-
	1985	0.588	17,982	10.1	-	0.486	89,309	9.5	-	0.292	8,169	3.6	-	0.371	9,631	5.2	-
	1986	0.625	16,657	11.0	-	0.510	84,261	10.1	-	0.317	7,310	4.1	-	0.422	7,512	6.3	-
	1987	0.673	16,083	11.1	-	0.519	78,782	10.3	-	0.322	6,868	4.1	-	0.423	6,391	6.5	-
	1988	0.637	16,548	10.3	-	0.514	74,204	9.1	-	0.353	7,000	4.9	-	0.425	6,036	5.6	-
	1989	0.603	15,041	9.7	-	0.497	71,797	8.7	-	0.299	6,656	3.7	-	0.398	5,482	5.5	-
	1990	0.563	13,922	8.6	-	0.491	71,243	8.1	-	0.299	6,663	3.4	-	0.367	5,141	4.5	-
	1991	0.685	12,170	10.8	-	0.607	67,682	11.4	-	0.311	3,907	3.1	-	0.416	4,539	6.4	-
	1992	0.682	11,248	9.9	-	0.608	62,405	10.6	-	0.308	4,223	3.5	-	0.446	3,714	6.1	-
	1993	0.600	9,825	7.5	-	0.605	55,970	10.5	-	0.262	5,740	2.5	-	0.457	4,370	6.8	-
	1994	0.624	10,457	8.3	-	0.548	52,634	10.2	-	0.258	6,335	2.2	-	0.386	4,766	5.4	-
1.0	1995	0.643	11,998	8.6	30.4	0.538	47,413	9.9	30.6	0.238	5,953	1.7	6.8	0.353	4,188	3.8	16.2
	1996	0.664	11,939	8.3	33.3	0.525	42,850	9.1	29.9	0.238	6,600	1.2	6.6	0.307	4,445	2.8	14.4
	1997	0.666	16,607	7.8	32.5	0.500	41,916	8.7	28.5	0.247	7,595	1.1	6.6	0.294	4,396	2.4	12.8
	1998	0.565	23,797	6.5	26.4	0.515	40,691	9.1	29.7	0.194	9,341	1.0	5.4	0.274	4,170	2.2	12.4
	1999	0.572	33,562	5.3	26.7	0.590	36,558	9.3	32.2	0.187	10,381	1.0	6.0	0.325	4,205	3.5	15.5
	2000	0.555	30,747	5.1	25.2	0.582	32,727	8.5	31.7	0.189	9,815	1.1	5.6	0.360	4,032	2.9	16.3
	2001	0.534	31,557	4.9	24.1	0.475	33,748	8.8	29.7	0.191	10,091	1.0	5.6	0.291	3,842	2.7	14.7
	2002	0.507	25,595	4.5	23.0	0.473	30,994	7.7	27.7	0.153	9,621	0.9	4.5	0.258	3,155	2.3	12.7
	2003	0.468	23,906	3.2	20.2	0.458	28,414	6.6	25.6	0.148	8,350	0.8	4.3	0.285	2,220	3.1	14.9

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m³ - milligrams per cubic meter
MRE - Mining Research Establishment MSHA - Mine Safety and Health Administration
NOTE: In coal mining, for respirable dust containing less than or equal to 5% quartz, the MSHA PEL is 2 mg/m³ MRE; for respirable dust containing greater than 5% quartz, the MSHA PEL is [(10 mg/m³ MRE) / (% quartz)]. The NIOSH REL of 1 mg/m³ MRE for respirable coal mine dust was adopted in September of 1995. Geometric means are reported in MRE equivalent. All samples are compared to the MSHA PEL of 2 mg/m³ MRE for respirable coal mine dust containing less than or equal to 5% quartz, regardless of actual quartz content. See appendices for source description, methods, and agents.
SOURCE: MSHA coal mine inspector and mine operator dust data.

Table 2-15. Respirable coal mine dust: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1995–2003

CIC	Industry	Number of Samples	GM (mg/m^3)	% > PEL	% > REL
041	Coal mining	657,419	0.458	6.5	24.6
	All other industries*	28	0.063	0.0	4.2
	TOTAL	**657,447**	**0.458**	**6.5**	**24.6**

CIC - Census Industry Code PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean
mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment MSHA - Mine Safety and Health Administration
OSHA - Occupational Safety and Health Administration
* includes industries with no samples exceeding the REL or industries with less than 10 samples.
NOTE: In coal mining, for respirable dust containing less than or equal to 5% quartz, the MSHA PEL is 2 mg/m^3 MRE; for respirable dust containing greater than 5% quartz, the MSHA PEL is [(10 mg/m^3 MRE) / (% quartz)]. The NIOSH REL of 1 mg/m^3 MRE for respirable coal mine dust was adopted in September of 1995. Geometric means are reported in MRE equivalent. All samples are compared to the MSHA PEL of 2 mg/m^3 MRE for respirable coal mine dust containing less than or equal to 5% quartz, regardless of actual quartz content. See appendices for source description, methods, and industry codes.
SOURCE: MSHA coal mine inspector and mine operator dust data. OSHA Integrated Management Information System.

Table 2-16 (page 1 of 3). Respirable coal mine dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA coal mine district and state, MSHA inspector and mine operator samples, 1979–2003

	All years		1979–1989			1990–1994			1995–2003			
MSHA Coal Mine District	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	No. of Samples	GM (mg/m^3)	% > PEL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
District 1 (Anthracite coal mining regions in Pennsylvania)	**47,537**	**0.202**	**22,699**	**0.218**	**2.7**	**9,269**	**0.184**	**2.4**	**15,569**	**0.191**	**2.6**	**9.6**
District 2 (Bituminous coal mining regions in Pennsylvania)	**315,887**	**0.499**	**208,477**	**0.514**	**9.7**	**39,729**	**0.559**	**9.3**	**67,681**	**0.427**	**5.1**	**22.3**
District 3	**278,414**	**0.553**	**183,654**	**0.591**	**12.7**	**37,586**	**0.532**	**7.5**	**57,174**	**0.458**	**5.2**	**24.3**
Maryland	11,559	0.589	5,655	0.677	13.1	1,496	0.617	6.8	4,408	0.485	5.0	30.0
Ohio	92,171	0.592	66,363	0.672	16.3	9,714	0.476	5.8	16,094	0.401	4.9	23.6
Northern West Virginia	174,684	0.531	111,636	0.543	10.5	26,376	0.550	8.1	36,672	0.482	5.3	23.9
District 4 (Southern West Virginia)	**505,675**	**0.537**	**306,684**	**0.571**	**14.6**	**76,841**	**0.526**	**10.4**	**122,150**	**0.465**	**7.8**	**25.0**
District 5 (Virginia)	**319,938**	**0.459**	**189,744**	**0.464**	**9.3**	**54,490**	**0.505**	**8.1**	**75,704**	**0.415**	**4.8**	**18.8**
District 6 (Eastern Kentucky)	**317,849**	**0.408**	**154,077**	**0.392**	**7.0**	**57,013**	**0.464**	**8.1**	**106,759**	**0.403**	**5.4**	**19.5**
District 7	**296,787**	**0.440**	**143,673**	**0.443**	**7.2**	**61,850**	**0.474**	**6.6**	**91,264**	**0.415**	**5.2**	**20.1**
Northern Georgia	29	0.328	29	0.328	0	0	-	-	0	-	-	-
Central Kentucky	247,707	0.449	111,869	0.452	7.4	53,154	0.483	6.7	82,684	0.425	5.3	20.4
North Carolina	9	0.147	6	0.159	0	3	0.126	0	0	-	-	-
South Carolina	0	-	0	-	-	0	-	-	0	-	-	-
Tennessee	49,037	0.399	31,769	0.413	6.4	8,693	0.425	5.6	8,575	0.328	4.9	16.8
District 8	**163,445**	**0.758**	**99,896**	**0.681**	**14.6**	**25,965**	**0.898**	**14.1**	**37,584**	**0.894**	**14.7**	**49.5**
Illinois	143,956	0.805	90,824	0.730	15.6	23,314	0.973	14.8	29,818	0.933	14.0	50.5
Indiana	17,794	0.506	7,566	0.342	5.2	2,496	0.455	8.3	7,732	0.768	17.4	45.8
Iowa	886	0.384	813	0.388	5.3	73	0.344	0	0	-	-	-
Michigan	0	-	0	-	-	0	-	-	0	-	-	-
Minnesota	0	-	0	-	-	0	-	-	0	-	-	-
Northern Missouri	809	0.248	693	0.259	1.7	82	0.240	2.4	34	0.107	0	0
Wisconsin	0	-	0	-	-	0	-	-	0	-	-	-

See footnotes at end of table.

Table 2-16 (page 2 of 3). Respirable coal mine dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA coal mine district and state, MSHA inspector and mine operator samples, 1979–2003

MSHA Coal Mine District	All years		1979–1989			1990–1994			1995–2003			
	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	No. of Samples	GM (mg/m^3)	% > PEL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
District 9	**135,558**	**0.658**	**78,638**	**0.696**	**19.7**	**21,908**	**0.756**	**14.9**	**35,012**	**0.532**	**7.4**	**30.3**
Alaska	267	0.303	181	0.408	6.6	48	0.237	2.1	38	0.099	-	2.9
Arizona	1,025	0.219	484	0.310	5.0	198	0.302	4.5	343	0.112	1.2	1.2
Arkansas	442	0.177	238	0.205	2.5	37	0.149	2.7	167	0.149	1.2	6.0
California	12	0.218	0	-	-	1	0.400	-	11	0.206	-	9.1
Colorado	42,900	0.833	25,704	0.846	24.1	6,577	0.913	16.3	10,619	0.758	8.3	37.7
Hawaii	0	-	0	-	-	0	-	-	0	-	-	-
Idaho	0	-	0	-	-	0	-	-	0	-	-	-
Kansas	555	0.207	381	0.236	2.6	49	0.190	0	125	0.142	0.8	0.8
Louisiana	178	0.193	14	0.163	-	39	0.228	0	125	0.186	-	4.3
Southern Missouri	742	0.230	452	0.254	1.8	56	0.160	0	234	0.209	1.3	7.6
Montana	2,015	0.269	1,095	0.367	7.2	211	0.248	2.8	709	0.170	2.4	4.9
Nebraska	0	-	0	-	-	0	-	-	0	-	-	-
Nevada	0	-	0	-	-	0	-	-	0	-	-	-
New Mexico	6,231	0.541	3,531	0.769	23.8	870	0.749	20.1	1,830	0.235	2.8	8.7
North Dakota	1,515	0.166	1,028	0.220	1.9	162	0.154	0.6	325	0.070	0.3	0.9
Oklahoma	5,329	0.331	2,949	0.342	6.7	973	0.322	6.6	1,407	0.313	3.0	11.3
Oregon	0	-	0	-	-	0	-	-	0	-	-	-
Texas	4,560	0.161	2,738	0.194	1.4	664	0.198	3.9	1,158	0.092	0.8	2.5
Utah	58,873	0.835	33,984	0.834	21.7	10,212	0.925	16.3	14,677	0.781	9.5	38.7
Washington	394	0.157	124	0.166	0	74	0.257	2.7	196	0.127	0.5	3.1
Wyoming	10,520	0.418	5,735	0.479	12.4	1,737	0.567	14.1	3,048	0.272	5.7	16.9

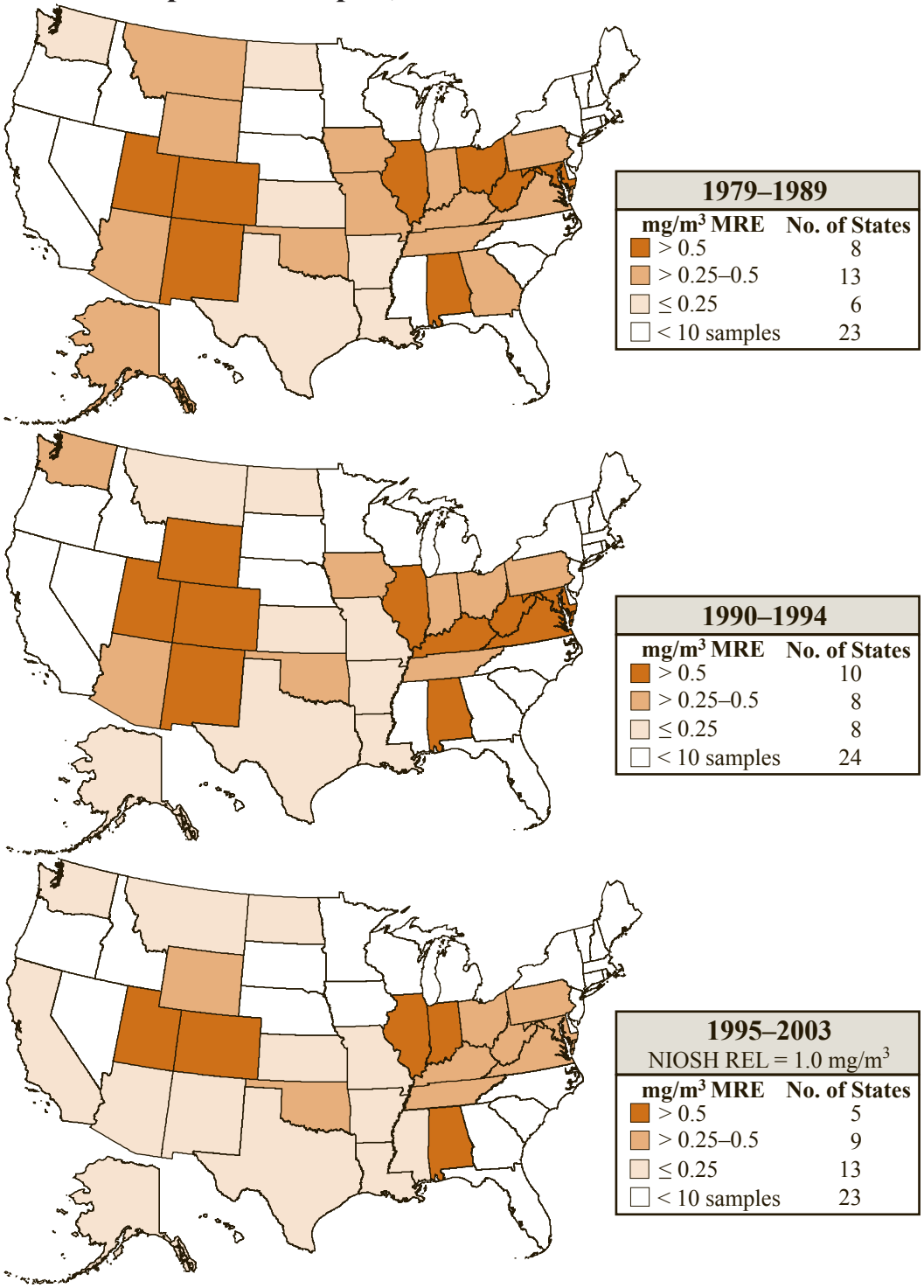
See footnotes at end of table.

Table 2-16 (page 3 of 3). Respirable coal mine dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA coal mine district and state, MSHA inspector and mine operator samples, 1979–2003

	All years		1979–1989			1990–1994			1995–2003			
MSHA Coal Mine District	**No. of Samples**	**GM (mg/m^3)**	**No. of Samples**	**GM (mg/m^3)**	**% > PEL**	**No. of Samples**	**GM (mg/m^3)**	**% > PEL**	**No. of Samples**	**GM (mg/m^3)**	**% > PEL**	**% > REL**
District 10 (Western Kentucky)	**86,886**	**0.693**	**50,904**	**0.603**	**12.1**	**14,234**	**0.847**	**14.8**	**21,748**	**0.839**	**12.0**	**48.3**
District 11	**97,389**	**0.658**	**52,546**	**0.714**	**15.7**	**18,069**	**0.719**	**10.4**	**26,774**	**0.528**	**6.1**	**28.0**
Alabama	97,340	0.659	52,546	0.714	15.7	18,069	0.719	10.4	26,725	0.531	6.1	28.0
Florida	0	-	0	-	-	0	-	-	0	-	-	-
Central and Southern Georgia	0	-	0	-	-	0	-	-	0	-	-	-
Mississippi	46	0.040	0	-	-	0	-	-	46	0.040	0	0
Puerto Rico	0	-	0	-	-	0	-	-	0	-	-	-
Virgin Islands	0	-	0	-	-	0	-	-	0	-	-	-
TOTAL	**2,565,365**	**0.510**	**1,490,992**	**0.526**	**11.6**	**416,954**	**0.541**	**9.3**	**657,419**	**0.458**	**6.5**	**24.6**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
MRE - Mining Research Establishment MSHA - Mine Safety and Health Administration
NOTE: In coal mining, for respirable dust containing less than or equal to 5% quartz, the MSHA PEL is 2 mg/m^3 MRE; for respirable dust containing greater than 5% quartz, the MSHA PEL is [(10 mg/m^3 MRE) / (% quartz)]. The NIOSH REL of 1 mg/m^3 MRE for respirable coal mine dust was adopted in September of 1995. Geometric means are reported in MRE equivalent. All samples are compared to the MSHA PEL for respirable coal mine dust containing less than or equal to 5% quartz, regardless of actual quartz content. See appendices for source description and methods.
SOURCE: MSHA coal mine inspector and mine operator dust data.

Figure 2-7. Respirable coal mine dust: Geometric mean exposures by state, MSHA inspector and mine operator samples, 1979–2003

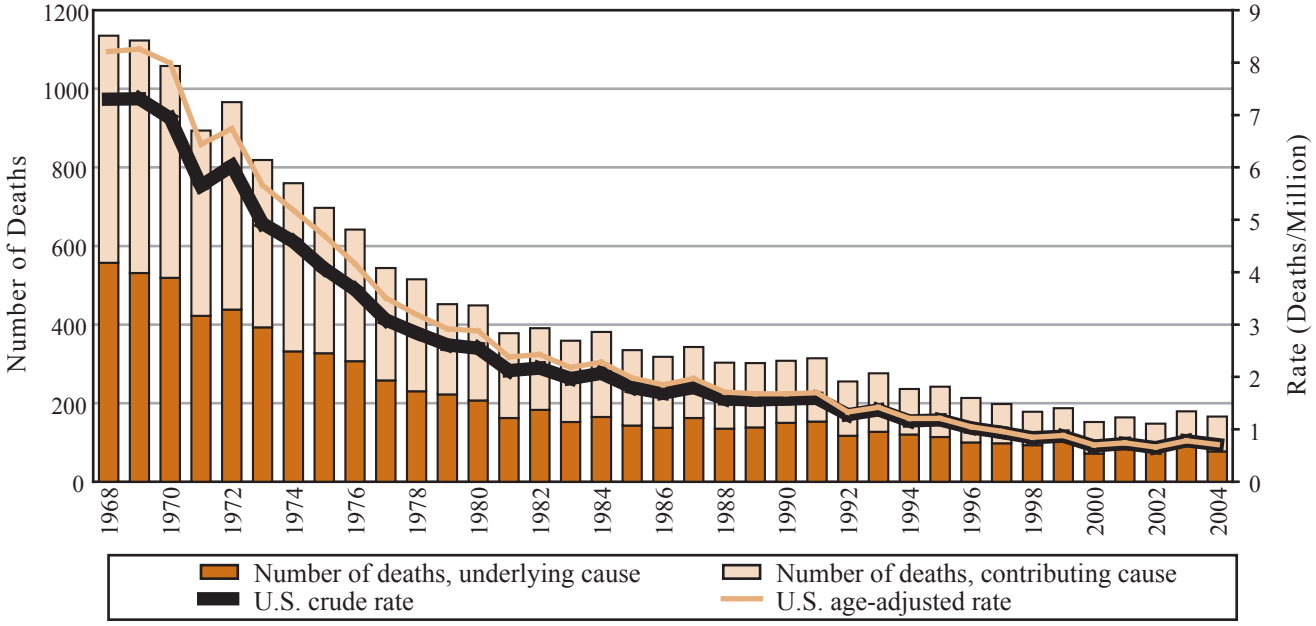


REL - recommended exposure limit mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment
MSHA - Mine Safety and Health Administration
NOTE: The NIOSH REL of 1 mg/m^3 MRE for respirable coal mine dust was adopted in September of 1995. Geometric means are reported in MRE equivalent. See appendices for source description, methods, and agents.
SOURCE: MSHA coal mine inspector and mine operator dust data.

Section 3

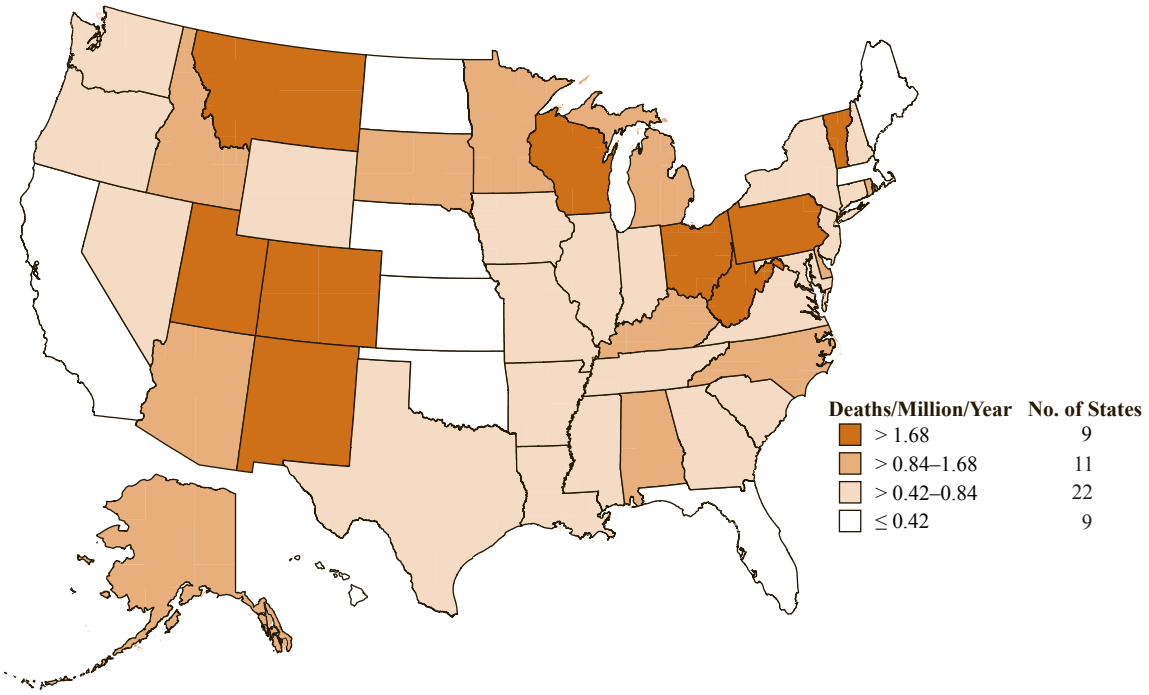
Silicosis and Related Exposures

Figure 3-1. Silicosis: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1968–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 3-2. Silicosis: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 3-1. Silicosis: Number of deaths by sex, race, age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	242	47.1	232	10	198	42	2	-	-	2	8	28	70	98	36	76
1996	213	46.9	207	6	185	26	2	-	1	2	7	25	54	83	41	76
1997	198	49.5	189	9	163	32	3	-	-	4	7	26	67	58	36	74
1998	178	52.2	174	4	158	18	2	-	-	5	9	17	47	68	32	76
1999	187	55.1	181	6	154	30	3	-	-	3	9	21	58	61	35	75
2000	152	47.4	144	8	128	23	1	-	2	3	3	16	35	64	29	77
2001	164	50.6	159	5	137	26	1	-	-	1	5	25	46	55	32	75
2002	148	60.8	138	10	124	21	3	-	-	5	8	17	41	51	26	75
2003	179	57.0	168	11	152	25	2	1	1	4	8	13	52	56	44	77
2004	166	46.4	160	6	137	29	-	-	-	3	7	24	44	58	30	75
TOTAL	**1,827**	**51.0**	**1,752**	**75**	**1,536**	**272**	**19**	**1**	**4**	**32**	**71**	**212**	**514**	**652**	**341**	**76**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 3-2. Silicosis: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1995	1.18	2.27	0.09	3.59	0.15	0.49	-
1996	1.03	2.12	0.07	2.29	-	0.46	-
1997	0.94	1.82	0.09	2.68	0.07	0.68	-
1998	0.84	1.80	0.03	1.44	0.07	0.44	-
1999	0.87	1.72	0.05	2.42	0.07	0.64	-
2000	0.68	1.34	0.09	1.85	-	0.18	-
2001	0.73	1.47	0.04	1.98	0.07	0.17	-
2002	0.65	1.26	0.08	1.55	0.07	0.34	0.16
2003	0.78	1.52	0.11	1.91	-	0.32	-
2004	0.71	1.40	0.06	2.17	-	-	-
1995–2004	**0.82**	**1.64**	**0.07**	**2.13**	**0.05**	**0.33**	**0.02**
			Age-Adjusted Death Rate				
1995	1.21	2.73	0.07	6.60	0.21	0.72	-
1996	1.05	2.59	0.05	3.86	-	1.00	-
1997	0.96	2.14	0.08	4.57	0.10	1.10	-
1998	0.85	2.10	0.03	2.44	0.07	0.84	-
1999	0.88	1.97	0.04	3.93	0.07	1.25	-
2000	0.70	1.59	0.07	3.42	-	0.19	-
2001	0.74	1.69	0.04	3.70	0.07	0.40	-
2002	0.66	1.45	0.07	2.87	0.08	0.57	0.17
2003	0.78	1.78	0.10	3.13	-	0.51	-
2004	0.71	1.56	0.05	3.70	-	-	-
1995–2004	**0.84**	**1.92**	**0.06**	**3.79**	**0.06**	**0.60**	**0.02**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 3-3. Silicosis: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	220	5	65	15	5	-	310
1996	240	-	60	-	15	-	315
1997	225	35	75	-	-	-	335
1998	260	5	55	25	-	-	345
1999	180	-	110	25	-	-	315
2000	210	5	40	-	15	-	270
2001	170	10	30	15	-	-	225
2002	225	55	35	5	5	5	330
2003	215	30	95	-	25	-	365
2004	215	-	85	-	-	-	300
TOTAL	**2,160**	**145**	**650**	**85**	**65**	**5**	**3,110**
	Years of Potential Life Lost to Life Expectancy						
1995	1,995	100	405	37	35	-	2,572
1996	1,881	57	301	-	36	-	2,275
1997	1,758	132	371	9	43	-	2,313
1998	1,737	39	204	38	23	-	2,041
1999	1,643	41	385	37	35	-	2,141
2000	1,318	97	257	-	30	-	1,702
2001	1,509	63	267	29	9	-	1,877
2002	1,411	153	214	22	31	22	1,853
2003	1,584	166	351	-	49	-	2,150
2004	1,598	57	387	-	-	-	2,042
TOTAL	**16,434**	**905**	**3,142**	**172**	**291**	**22**	**20,966**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 3-4. Silicosis: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	4	3	1	8	4	2	1	3	4	2	**32**
Alaska	-	1	-	-	-	1	-	-	-	-	**2**
Arizona	6	3	3	3	4	1	3	3	8	2	**36**
Arkansas	3	1	2	2	3	2	-	1	1	1	**16**
California	14	13	5	4	6	8	9	4	6	7	**76**
Colorado	9	10	7	6	7	4	3	7	10	5	**68**
Connecticut	2	3	1	4	1	1	3	1	2	-	**18**
Delaware	1	1	1	-	1	1	-	-	-	1	**6**
District of Columbia	1	-	1	-	-	-	-	1	-	-	**3**
Florida	6	5	6	6	5	1	3	7	7	6	**52**
Georgia	6	4	4	3	2	2	1	-	3	3	**28**
Hawaii	-	-	-	-	-	-	-	1	-	-	**1**
Idaho	2	3	2	1	-	-	3	-	2	2	**15**
Illinois	5	7	8	7	5	5	8	4	7	2	**58**
Indiana	1	2	5	5	5	8	4	3	3	2	**38**
Iowa	2	1	4	4	1	1	4	-	-	-	**17**
Kansas	3	-	1	1	1	-	-	-	-	1	**7**
Kentucky	5	3	4	5	2	6	4	3	2	3	**37**
Louisiana	2	2	2	1	5	1	4	4	3	1	**25**
Maine	-	1	-	-	1	-	-	1	1	-	**4**
Maryland	2	4	1	3	5	2	-	6	1	3	**27**
Massachusetts	2	2	5	3	1	2	3	1	-	-	**19**
Michigan	12	16	5	9	6	8	4	4	4	9	**77**
Minnesota	6	6	5	-	4	3	6	1	3	7	**41**
Mississippi	1	1	3	1	2	1	1	2	3	3	**18**
Missouri	6	3	5	3	3	2	2	3	1	4	**32**
Montana	2	2	1	1	2	2	2	1	1	-	**14**
Nebraska	-	1	-	-	1	-	-	-	1	-	**3**
Nevada	2	-	1	-	-	1	-	1	-	2	**7**
New Hampshire	-	-	2	-	-	-	-	-	1	1	**4**
New Jersey	3	3	4	4	3	3	5	2	6	3	**36**
New Mexico	4	1	5	2	2	1	2	3	3	2	**25**
New York	9	10	6	8	8	9	4	10	4	10	**78**
North Carolina	12	6	9	5	6	6	5	1	4	6	**60**
North Dakota	-	1	-	-	-	-	-	-	-	-	**1**
Ohio	20	16	12	16	23	15	15	14	17	12	**160**
Oklahoma	-	-	1	-	5	1	1	-	1	1	**10**
Oregon	2	2	-	1	5	2	3	1	1	5	**22**
Pennsylvania	43	38	33	24	20	20	24	18	21	16	**257**
Rhode Island	-	2	3	-	2	-	1	-	2	3	**13**
South Carolina	-	3	2	1	2	3	5	-	1	1	**18**
South Dakota	-	1	1	-	1	2	-	1	1	-	**7**
Tennessee	2	2	3	5	3	-	4	2	4	4	**29**
Texas	11	9	11	8	12	6	8	14	15	12	**106**
Utah	4	-	3	3	1	2	6	4	2	1	**26**
Vermont	-	1	2	2	1	1	1	-	1	1	**10**
Virginia	3	2	3	6	1	4	4	1	5	7	**36**
Washington	2	2	2	4	3	2	1	2	3	2	**23**
West Virginia	8	6	6	5	6	4	1	6	4	1	**47**
Wisconsin	14	10	6	4	6	6	6	7	8	12	**79**
Wyoming	-	-	1	-	-	-	-	-	2	-	**3**
TOTAL	**242**	**213**	**198**	**178**	**187**	**152**	**164**	**148**	**179**	**166**	**1,827**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 3-5. Silicosis: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	32	19	0.91	18	0.90	19	464	15	14.5	12
Alaska	2	49	0.43	41	1.27	12	15	50	7.4	49
Arizona	36	16	0.91	18	0.90	19	439	18	12.2	31
Arkansas	16	34	0.76	23	0.72	28	348	24	21.7	2
California	76	7	0.29	48	0.33	46	972	5	12.8	24
Colorado	68	8	2.01	4	2.59	2	813	8	12.0	34
Connecticut	18	30	0.67	28	0.61	34	236	33	13.1	19
Delaware	6	43	0.96	16	0.98	18	65	44	10.8	41
District of Columbia	3	46	0.63	33	0.67	31	60	45	19.8	3
Florida	52	11	0.40	43	0.32	48	672	11	12.9	21
Georgia	28	22	0.44	40	0.57	37	328	28	11.7	37
Hawaii	1	50	0.10	51	0.10	51	22	48	22.0	1
Idaho	15	35	1.51	11	1.63	10	154	35	10.3	45
Illinois	58	10	0.60	34	0.62	33	807	9	13.9	14
Indiana	38	14	0.80	22	0.81	22	569	13	15.0	9
Iowa	17	33	0.73	25	0.61	34	177	34	10.4	44
Kansas	7	40	0.33	47	0.33	46	90	40	12.9	21
Kentucky	37	15	1.14	13	1.18	13	510	14	13.8	16
Louisiana	25	25	0.72	26	0.76	26	384	22	15.3	8
Maine	4	44	0.38	44	0.35	44	46	46	11.6	39
Maryland	27	23	0.65	30	0.72	28	331	27	12.3	29
Massachusetts	19	29	0.37	45	0.36	43	239	32	12.6	27
Michigan	77	6	0.99	15	1.01	16	951	6	12.3	29
Minnesota	41	13	1.05	14	1.05	14	413	21	10.1	47
Mississippi	18	30	0.81	20	0.82	21	333	26	18.5	4
Missouri	32	19	0.72	26	0.68	30	423	20	13.2	18
Montana	14	36	1.94	5	1.84	7	128	38	9.2	48
Nebraska	3	46	0.22	49	0.18	49	21	49	7.1	50
Nevada	7	40	0.45	39	0.54	38	76	42	10.9	40
New Hampshire	4	44	0.41	42	0.42	42	66	43	16.5	6
New Jersey	36	16	0.54	36	0.52	40	440	17	12.2	31
New Mexico	25	25	1.78	7	1.90	6	351	23	14.0	13
New York	78	5	0.52	37	0.51	41	937	7	12.0	34
North Carolina	60	9	0.94	17	1.00	17	766	10	12.8	24
North Dakota	1	50	0.19	50	0.13	50	6	51	6.1	51
Ohio	160	2	1.78	7	1.72	9	2,013	2	12.6	27
Oklahoma	10	38	0.37	45	0.35	44	130	37	13.0	20
Oregon	22	28	0.81	20	0.79	24	257	31	11.7	37
Pennsylvania	257	1	2.60	2	2.15	4	2,765	1	10.8	41
Rhode Island	13	37	1.53	10	1.33	11	137	36	10.6	43
South Carolina	18	30	0.56	35	0.58	36	268	30	14.9	10
South Dakota	7	40	1.18	12	1.02	15	84	41	12.0	34
Tennessee	29	21	0.64	31	0.66	32	456	16	15.7	7
Texas	106	3	0.66	29	0.78	25	1,787	3	16.9	5
Utah	26	24	1.57	9	2.17	3	334	25	12.8	24
Vermont	10	38	2.03	3	2.02	5	103	39	10.3	45
Virginia	36	16	0.64	31	0.73	27	436	19	12.1	33
Washington	23	27	0.49	38	0.54	38	308	29	13.4	17
West Virginia	47	12	3.17	1	2.78	1	653	12	13.9	14
Wisconsin	79	4	1.86	6	1.80	8	1,022	4	12.9	21
Wyoming	3	46	0.76	23	0.80	23	44	47	14.7	11

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 3-6. Silicosis: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
060	Construction	118	13.4
040	Metal mining	86	9.8
041	Coal mining	69	7.8
270	Blast furnaces, steelworks, rolling and finishing mills	51	5.8
271	Iron and steel foundries	49	5.6
050	Nonmetallic mining and quarrying, except fuel	48	5.5
262	Miscellaneous nonmetallic mineral and stone products	44	5.0
392	Not specified manufacturing industries	33	3.8
331	Machinery, except electrical, n.e.c.	23	2.6
252	Structural clay products	20	2.3
	All other industries	317	36.0
	Industry not reported	23	2.6
	TOTAL	**881**	**100.0**

CIC - Census Industry Code n.e.c. - not elsewhere classified
NOTE: The comparable number of silicosis deaths in the entire United States for this same time period was 2,407. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 3-7. Silicosis: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
616	Mining machine operators	138	15.7
889	Laborers, except construction	84	9.5
019	Managers and administrators, n.e.c.	34	3.9
633	Supervisors, production occupations	32	3.6
453	Janitors and cleaners	30	3.4
779	Machine operators, not specified	30	3.4
869	Construction laborers	26	3.0
719	Molding and casting machine operators	25	2.8
804	Truck drivers	20	2.3
243	Supervisors and proprietors, sales occupations	18	2.0
	All other occupations	422	47.9
	Occupation not reported	22	2.5
	TOTAL	**881**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of silicosis deaths in the entire United States for this same time period was 2,407. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 3-8. Silicosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
040	Metal mining	86	41.7	33.6	51.8
262	Miscellaneous nonmetallic mineral and stone products	44	30.7	22.2	41.2
261	Pottery and related products	17	29.3	17.0	46.9
050	Nonmetallic mining and quarrying, except fuel	48	29.2	21.5	38.8
271	Iron and steel foundries	49	21.6	16.0	28.5
252	Structural clay products	20	19.7	12.0	30.4
041	Coal mining	69	6.2	4.8	7.9
300	Miscellaneous fabricated metal products	18	5.7	3.4	9.0
251	Cement, concrete, gypsum, and plaster products	8	4.2	1.8	8.3
280	Other primary metal industries	9	3.5	1.6	6.6
270	Blast furnaces, steelworks, rolling and finishing mills	51	3.2	2.4	4.2
682	Miscellaneous retail stores	7	3.2	1.3	6.5
250	Glass and glass products	10	3.0	1.4	5.5
331	Machinery, except electrical, n.e.c.	23	2.5	1.6	3.7
392	Not specified manufacturing industries	33	1.6	1.1	2.2
060	Construction	118	1.3	1.1	1.5

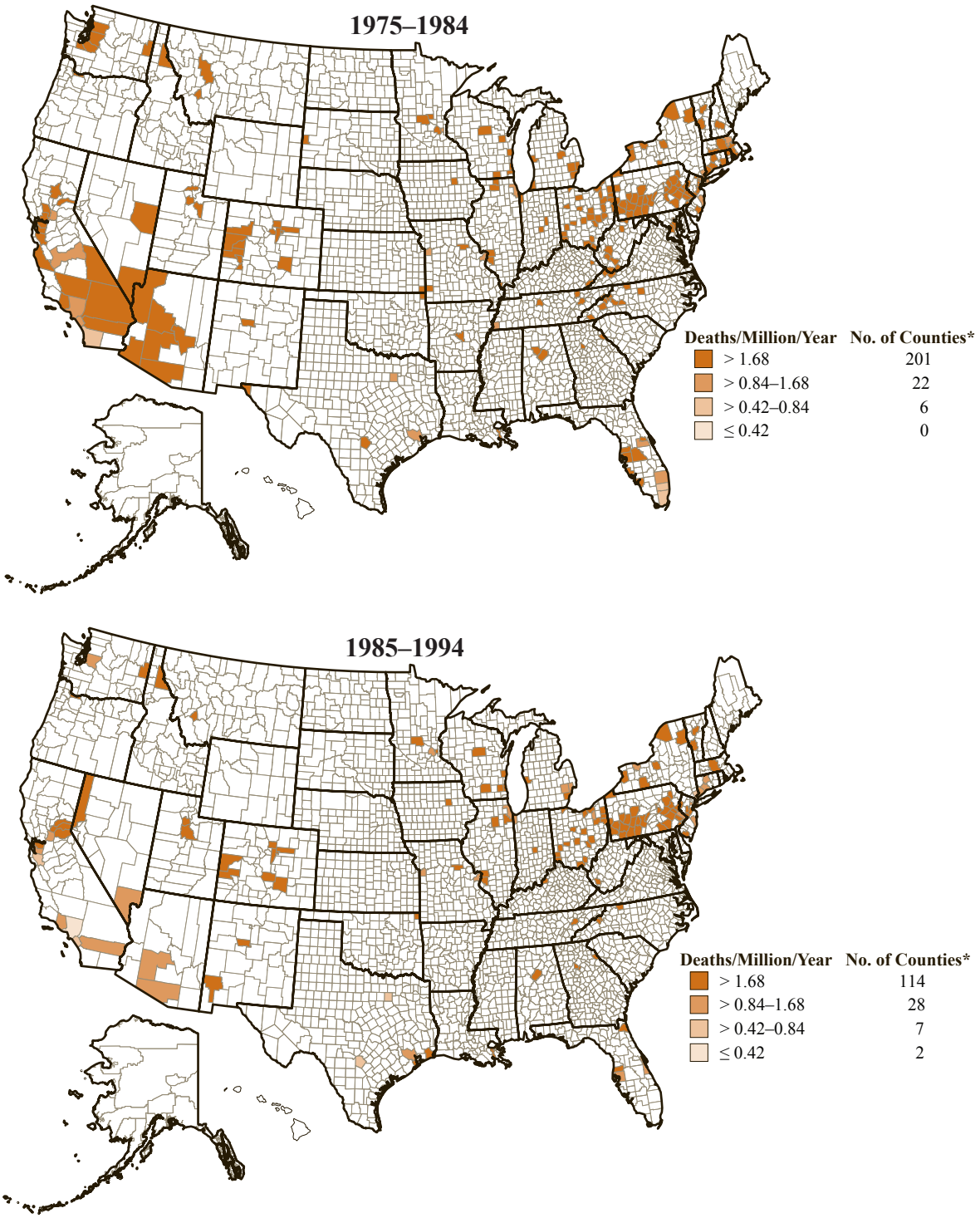
CIC - Census Industry Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with silicosis reported was 881 in these same selected states and years, and the comparable number of silicosis deaths in the entire United States for this same time period was 2,407. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 3-9. Silicosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval LCL	95% Confidence Interval UCL
725	Miscellaneous metal and plastic processing machine operators	10	92.6	44.5	170.3
787	Hand molding, casting, and forming occupations	8	41.9	18.1	82.5
675	Hand molders and shapers, except jewelers	14	38.9	21.2	65.2
768	Crushing and grinding machine operators	17	33.0	19.2	52.9
719	Molding and casting machine operators	25	19.3	12.5	28.5
617	Mining occupations, n.e.c.	8	15.8	6.8	31.2
616	Mining machine operators	138	13.1	11.0	15.5
613	Supervisors, extractive occupations	7	12.9	5.2	26.5
599	Construction trades, n.e.c.	8	6.8	2.9	13.3
766	Furnace, kiln, and oven operators, except food	11	5.2	2.6	9.4
709	Grinding, abrading, buffing, and polishing machine operators	7	4.5	1.8	9.3
849	Crane and tower operators	9	3.9	1.8	7.3
544	Millwrights	8	3.5	1.5	6.9
779	Machine operators, not specified	30	2.9	2.0	4.2
844	Operating engineers	15	2.3	1.3	3.8
889	Laborers, except construction	84	2.2	1.8	2.7
579	Painters, construction and maintenance	14	2.2	1.2	3.6
633	Supervisors, production occupations	32	1.8	1.2	2.5
869	Construction laborers	26	1.6	1.0	2.3

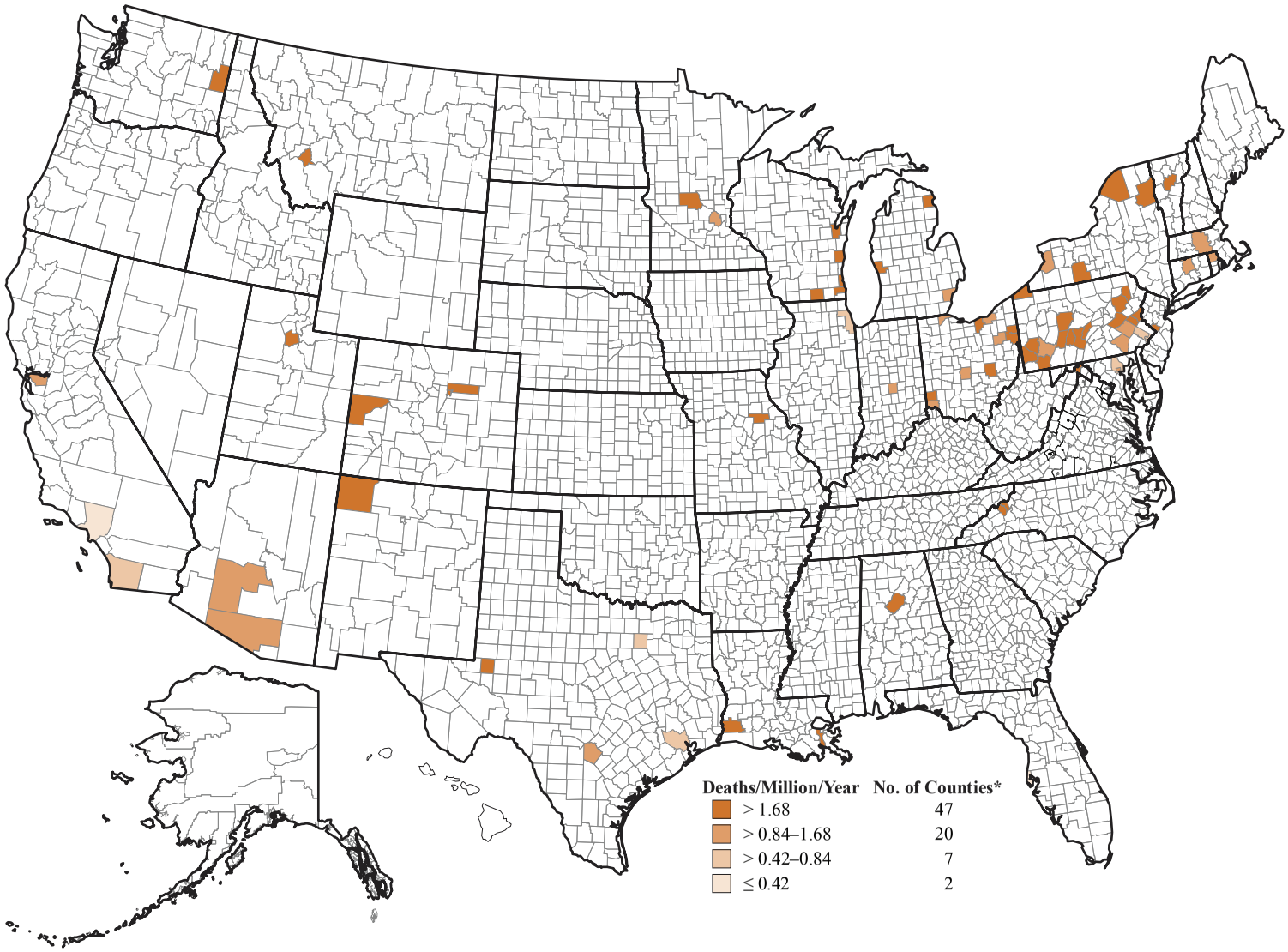
COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with silicosis reported was 881 in these same selected states and years, and the comparable number of silicosis deaths in the entire United States for this same time period was 2,407. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 3-3a. Silicosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1975–1984 and 1985–1994



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 3-3b. Silicosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 3-10. Silicosis: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 1995–2004

County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Morgan County	West Virginia	35.8	49.0	6	16.7
Yancey County	North Carolina	29.9	41.0	6	0.0
Mitchell County	North Carolina	28.7	38.5	5	0.0
Huntingdon County	Pennsylvania	22.1	23.9	9	0.0
Audrain County	Missouri	21.1	29.0	6	0.0
St. Lawrence County	New York	19.3	18.7	17	0.0
Silver Bow County	Montana	18.9	25.0	7	0.0
Alpena County	Michigan	15.2	19.7	5	0.0
Washington County	Vermont	13.6	14.8	7	0.0
Muskegon County	Michigan	13.4	13.6	18	0.0
Schuylkill County	Pennsylvania	13.2	20.0	25	0.0
Essex County	New York	13.2	15.7	5	0.0
Stearns County	Minnesota	12.3	10.3	11	9.1
Mifflin County	Pennsylvania	12.1	16.2	6	0.0
Mesa County	Colorado	11.0	13.0	12	0.0
San Juan County	New Mexico	10.3	8.3	7	0.0
Columbiana County	Ohio	8.8	10.0	9	0.0
Sheboygan County	Wisconsin	8.0	8.9	8	0.0
Clearfield County	Pennsylvania	7.8	10.3	7	0.0
Blair County	Pennsylvania	6.7	8.5	9	0.0
Steuben County	New York	6.7	7.7	6	0.0
Muskingum County	Ohio	6.6	7.5	5	0.0
Ector County	Texas	5.7	5.5	5	0.0
Cambria County	Pennsylvania	5.2	7.9	10	0.0
Brown County	Wisconsin	5.2	4.5	8	0.0
Luzerne County	Pennsylvania	4.9	7.9	21	0.0
Racine County	Wisconsin	4.8	4.8	7	0.0
Rock County	Wisconsin	4.3	4.2	5	0.0
Mahoning County	Ohio	4.2	5.3	11	0.0
Calcasieu Parish	Louisiana	3.8	3.5	5	0.0
Fayette County	Pennsylvania	3.7	5.0	6	0.0
Lorain County	Ohio	3.7	3.6	8	0.0
Milwaukee County	Wisconsin	3.0	2.9	21	0.0
Mercer County	New Jersey	2.9	2.9	8	50.0
Butler County	Ohio	2.8	2.3	6	0.0
Northampton County	Pennsylvania	2.7	3.2	7	0.0
Washington County	Pennsylvania	2.6	3.6	6	0.0
Adams County	Colorado	2.5	1.8	5	20.0
Allegheny County	Pennsylvania	2.4	3.2	34	0.0
Erie County	Pennsylvania	2.3	2.7	6	0.0
Salt Lake County	Utah	2.2	1.5	10	0.0
Spokane County	Washington	1.9	1.8	6	0.0
Denver County	Colorado	1.8	1.6	7	0.0
Jefferson County	Alabama	1.8	1.9	10	0.0
Jefferson Parish	Louisiana	1.8	1.7	6	0.0
Lackawanna County	Pennsylvania	1.7	2.9	5	0.0
Lehigh County	Pennsylvania	1.7	2.0	5	0.0
Stark County	Ohio	1.6	2.0	6	16.7
Franklin County	Ohio	1.6	1.3	11	18.2
Hartford County	Connecticut	1.5	1.8	12	0.0
Overall United States		**0.8**	**0.8**	**1,827**	**4.1**

NOTE: Only counties with at least 5 deaths from the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 3-11. Silicosis: Estimated number of discharges from short-stay non-federal hospitals, 1970–2004

Year	Number of Discharges
1970	6,000
1971	7,000
1972	6,000
1973	5,000
1974	4,000
1975	4,000
1976	5,000
1977	4,000
1978	2,000
1979	3,000
1980	1,000
1981	2,000
1982	3,000
1983	2,000
1984	2,000
1985	3,000
1986	3,000
1987	3,000
1988	3,000
1989	2,000
1990	3,000
1991	4,000
1992	3,000
1993	1,000
1994	3,000
1995	3,000
1996	4,000
1997	3,000
1998	1,000
1999	1,000
2000	1,000
2001	300
2002	2,000
2003	1,000
2004	1,000

NOTE: Number of discharges has been rounded. The National Center for Health Statistics recommends that, in statistical comparisons, estimates of less than 5,000 not be used and that estimates of 5,000 to 10,000 be used with caution. See appendices for source description and methods.
SOURCE: National Center for Health Statistics National Hospital Discharge Survey.

Table 3-12a. Silicosis: Number of cases by ascertainment source—Michigan, New Jersey, Ohio, 1993–2002

	Michigan		New Jersey		Ohio		Total	
Source	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Healthcare provider report	108	23.2	2	1.5	13	4.7	123	14.0
Hospital data	312	67.1	127	94.1	234	83.9	673	76.6
Death certificate data	10	2.2	2	1.5	9	3.2	21	2.4
Workers' compensation	35	7.5	-	-	19	6.8	54	6.1
Other	-	-	4	3.0	4	1.4	8	1.0
TOTAL	**465**	**100.0**	**135**	**100.0**	**279**	**100.0**	**879**	**100.0**

- indicates no cases reported.
NOTE: Percentages may not sum to 100% due to rounding. Hospital data may include reporting by hospital of inpatient hospitalization and reporting by hospital record review. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by K Rosenman, MJ Reilly, and D Kalinowski (Michigan); D Valiante, D Schill, and K McGreevy (New Jersey); and E Socie and A Migliozzi (Ohio).

Table 3-12b. Silicosis: Number of cases by ascertainment source—California, 2000–2002

Source	No.	%
Healthcare provider report	7	5.2
Hospital data	127	94.8
TOTAL	**134**	**100.0**

NOTE: Percentages may not sum to 100% due to rounding. Hospital data may include reporting by hospital of inpatient hospitalization and reporting by hospital record review. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of December 2006, reported by R Harrison and F Reinisch.

Table 3-13a. Silicosis: Number of cases by duration of occupational exposure to silica—Michigan, New Jersey, Ohio, 1993–2002

Years of Employment in Jobs with Potential Silica Exposure	Michigan		New Jersey		Ohio		Total	
	No.	%	No.	%	No.	%	No.	%
< 10 years	24	5.2	15	11.1	18	6.5	57	6.5
10–19 years	68	14.6	32	23.7	52	18.6	152	17.3
20–29 years	145	31.2	30	22.2	66	23.7	241	27.4
30–39 years	149	32.0	26	19.3	56	20.1	231	26.3
≥ 40 years	46	9.9	16	11.9	23	8.2	85	9.7
Unknown number of years	33	7.1	16	11.9	64	22.9	113	12.9
TOTAL	**465**	**100.0**	**135**	**100.0**	**279**	**100.0**	**879**	**100.0**

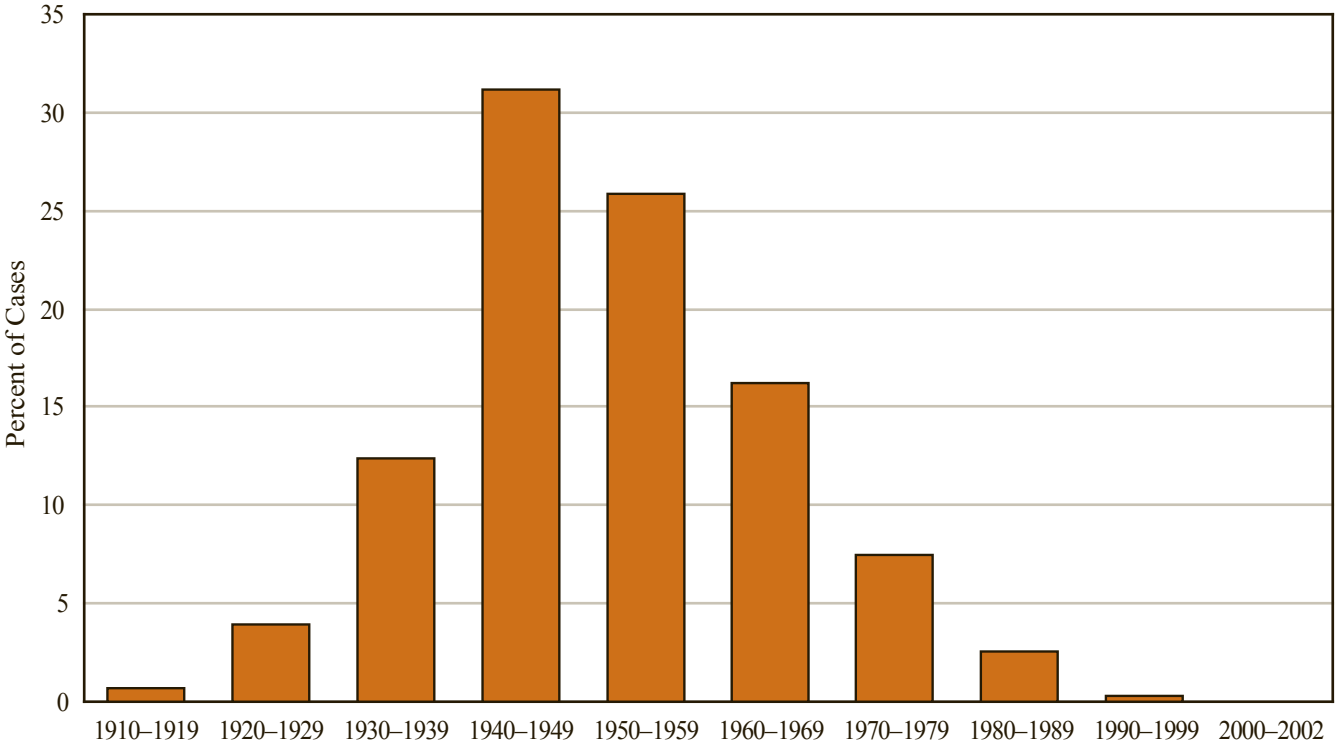
NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by K Rosenman, MJ Reilly, and D Kalinowski (Michigan); D Valiante, D Schill, and K McGreevy (New Jersey); and E Socie and A Migliozzi (Ohio).

Table 3-13b. Silicosis: Number of cases by duration of occupational exposure to silica—California, 2000–2002

Years of Employment in Jobs with Potential Silica Exposure	No.	%
< 10 years	9	6.7
10–19 years	18	13.4
20–29 years	24	17.9
30–39 years	15	11.2
≥ 40 years	18	13.4
Unknown number of years	50	37.3
TOTAL	**134**	**100.0**

NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of December 2006, reported by R Harrison and F Reinisch.

Figure 3-4. Silicosis: Decade of first exposure for 734 cases—Michigan, New Jersey, Ohio, 1993–2002



NOTE: Cases with unknown or missing date of first exposure are excluded.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by K Rosenman, MJ Reilly, and D Kalinowski (Michigan); D Valiante, D Schill, and K McGreevy (New Jersey); and E Socie and A Migliozzi (Ohio).

Table 3-14a. Silicosis: Primary industries associated with silica exposure of silicosis cases—Michigan, New Jersey, Ohio, 1993–2002

	Michigan		New Jersey		Ohio		Total	
Industry (SIC)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Agriculture, forestry, and fishing (01)	**1**	**0.2**	**1**	**0.7**	**-**	**-**	**2**	**0.2**
Mining	**13**	**2.8**	**20**	**14.8**	**17**	**6.1**	**50**	**5.7**
Mining and quarry of nonmetal minerals except fuel (14)	3	0.6	16	11.9	12	4.3	31	3.5
Metal mining (10)	9	1.9	3	2.2	-	-	12	1.4
All others within this division	1	0.2	1	0.7	5	1.8	7	0.8
Construction	**42**	**9.0**	**24**	**17.8**	**15**	**5.4**	**81**	**9.2**
Construction, special trade contractors (17)	34	7.3	12	8.9	11	3.9	57	6.5
Heavy construction other than building construction (16)	3	0.6	12	8.9	3	1.1	18	2.0
Building construction – general contractors and operative builders (15)	5	1.1	-	-	1	0.4	6	0.7
Manufacturing*	**393**	**84.5**	**85**	**63.0**	**239**	**85.7**	**717**	**81.6**
Primary metal industries (33)	340	73.1	17	12.6	121	43.4	478	54.4
Stone, clay, glass, and concrete products (32)	17	3.7	48	35.6	66	23.7	131	14.9
Fabricated metal products except machinery and transportation equipment (34)	6	1.3	5	3.7	20	7.2	31	3.5
Transportation equipment (37)	16	3.4	4	3.0	4	1.4	24	2.7
Industrial and commercial machinery and computer equipment (35)	5	1.1	1	0.7	16	5.7	22	2.5
Chemicals and allied products (28)	1	0.2	4	3.0	5	1.8	10	1.1
Electronic and other electrical equipment and components, except Computer Equipment (36)	2	0.4	1	0.7	3	1.1	6	0.7
Miscellaneous manufacturing industries (39)	6	1.3	-	-	-	-	6	0.7
Rubber and miscellaneous plastics products (30)	-	-	3	2.2	2	0.7	5	0.6
All others within this division	-	-	2	1.4	2	0.8	4	0.4
Transportation (40, 42, 49)	**2**	**0.4**	**2**	**1.5**	**-**	**-**	**4**	**0.5**
Wholesale trade (50)	**1**	**0.2**	**-**	**-**	**1**	**0.4**	**2**	**0.2**
Retail trade (59)	**1**	**0.2**	**1**	**0.7**	**-**	**-**	**2**	**0.2**
Finance, insurance, and real estate (65)	**-**	**-**	**-**	**-**	**1**	**0.4**	**1**	**0.1**
Services (75, 76, 80, 86)	**6**	**1.3**	**1**	**0.7**	**3**	**1.1**	**10**	**1.1**
Public administration (92, 95, 96, 97)	**3**	**0.6**	**1**	**0.7**	**1**	**0.4**	**5**	**0.6**
Unclassifiable (99)	**3**	**0.6**	**-**	**-**	**2**	**0.7**	**5**	**0.6**
TOTAL	**465**	**100.0**	**135**	**100.0**	**279**	**100.0**	**879**	**100.0**

- indicates no cases reported. SIC - Standard Industrial Classification

* Manufacturing includes the following SIC codes for cases less than 5 cases: 22, 29, 38.

NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description.

SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by K Rosenman, MJ Reilly, and D Kalinowski (Michigan); D Valiante, Schill, and K McGreevy (New Jersey); and E Socie and A Migliozzi (Ohio).

Table 3-14b. Silicosis: Primary industries associated with silica exposure of silicosis cases—California, 2000–2002

Industry (SIC)	No.	%
Agriculture, forestry, and fishing (01, 02)	**3**	**2.4**
Mining	**29**	**22.8**
Metal mining (10)	15	11.8
Mining and quarry of nonmetal minerals except fuel (14)	13	10.2
All others within this division	1	0.8
Construction	**18**	**14.2**
Construction, special trade contractors (17)	13	10.2
Heavy construction, other than building (16)	5	3.9
Manufacturing	**36**	**28.3**
Stone, clay, glass, and concrete products (32)	17	13.4
Primary metal industries (33)	7	5.5
Transportation equipment (37)	5	3.9
All others within this division	7	2.0
Transportation (40, 46)	**3**	**2.4**
Retail trade (52)	**1**	**0.8**
Services (73, 80, 82, 86, 87)	**6**	**4.7**
Public administration (97)	**3**	**2.4**
Unclassifiable (99)	**28**	**22.0**
TOTAL	**134**	**100.0**

SIC - Standard Industrial Classification
NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of December 2006, reported by R Harrison and F Reinisch.

Table 3-15a (page 1 of 2). Silicosis: Primary occupations associated with silica exposure of silicosis cases—Michigan, New Jersey, Ohio, 1993–2002

	Michigan		New Jersey		Ohio		Total	
Occupation (COC)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Managerial and professional specialty	**3**	**0.6**	**3**	**2.2**	**2**	**0.7**	**8**	**0.9**
Technical, sales, and administrative	**3**	**0.6**	**3**	**2.2**	**1**	**0.4**	**7**	**0.8**
Service occupations	**5**	**1.1**	**-**	**-**	**2**	**0.7**	**7**	**0.8**
Farming, forestry and fishing	**1**	**0.2**	**1**	**0.7**	**-**	**-**	**2**	**0.2**
Precision production, craft, and repair	**113**	**24.3**	**40**	**29.6**	**47**	**16.8**	**200**	**22.8**
Supervisors, production (628)	15	3.2	5	3.7	7	2.5	27	3.1
Hand molders and shapers, except jewelers (675)	23	4.9	2	1.5	2	0.7	27	3.1
Construction trades, n.e.c. (599)	16	3.4	3	2.2	7	2.5	26	3.0
Brickmasons and stonemasons (563)	11	2.4	4	3.0	7	2.5	22	2.5
Mining machine operators (616)	5	1.1	5	3.7	2	0.7	12	1.4
Millwrights (544)	6	1.3	-	-	1	0.4	7	0.8
Concrete/terrazzo finishers (588)	6	1.3	-	-	1	0.4	7	0.8
Mining occupations, n.e.c. (617)	1	0.2	2	1.5	4	1.4	7	0.8
Industrial machinery repairers (518)	1	0.2	3	2.2	2	0.7	6	0.7
Electricians (575)	3	0.6	2	1.5	-	-	5	0.6
Dental lab, medical appliance technicians (678)	4	0.9	-	-	1	0.4	5	0.6
All others within this grouping	22	4.7	14	10.4	13	4.7	4.9	5.6
Operators, fabricators, and laborers	**278**	**59.8**	**86**	**63.7**	**217**	**77.8**	**581**	**66.1**
Laborers, except construction (889)	98	21.1	20	14.8	52	18.6	170	19.3
Molding and casting machine operators (719)	55	11.8	2	1.5	24	8.6	81	9.2
Grinding, abrading, buffing, and polishing machine operators (709)	25	5.4	1	0.7	21	7.5	47	5.3
Crushing and grinding machine operators (768)	10	2.2	6	4.4	22	7.9	38	4.3
Miscellaneous metal and plastic processing machine operators (725)	9	1.9	4	3.0	21	7.5	34	3.9
Furnace, kiln, and oven operators, excluding food (766)	14	3.0	2	1.5	14	5.0	30	3.4
Miscellaneous machine operators, n.e.c. (777)	7	1.5	3	2.2	13	4.7	23	2.6
Hand molding, casting, and forming occupations (787)	3	0.6	10	7.4	8	2.9	21	2.4
Construction laborers (869)	4	0.9	11	8.1	3	1.1	18	2.0
Machine operators, not specified (779)	4	0.9	4	3.0	8	2.9	16	1.8
Miscellaneous hand working occupations (795)	14	3.0	-	-	-	-	14	1.6
Crane and tower operators (849)	6	1.3	1	0.7	3	1.1	10	1.1
Production inspectors, checkers, and examiners (796)	3	0.6	2	1.5	4	1.4	9	1.0

See footnotes at end of table.

Table 3-15a (page 2 of 2). Silicosis: Primary occupations associated with silica exposure of silicosis cases—Michigan, New Jersey, Ohio, 1993–2002

	Michigan		New Jersey		Ohio		Total	
Occupation (COC)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Operators, fabricators, and laborers (cont.)	**278**	**59.8**	**86**	**63.7**	**217**	**77.8**	**581**	**66.1**
Painting, paint spray machinery operators (759)	-	-	6	4.4	2	0.7	8	0.9
Welders and cutters (783)	3	0.6	2	1.5	3	1.1	8	0.9
Mixing, blending machine operators (756)	2	0.4	2	1.5	3	1.1	7	0.8
Operating engineers (844)	3	0.6	2	1.5	1	0.4	6	0.7
Industrial truck, tractor equipment operators (856)	2	0.4	-	-	3	1.1	5	0.6
All others within this grouping	16	3.4	8	5.9	12	4.3	36	4.1
Unclassifiable and miscellaneous unemployed	**62**	**13.3**	**2**	**1.5**	**10**	**3.6**	**74**	**8.4**
TOTAL	**465**	**100.0**	**135**	**100.0**	**279**	**100.0**	**879**	**100.0**

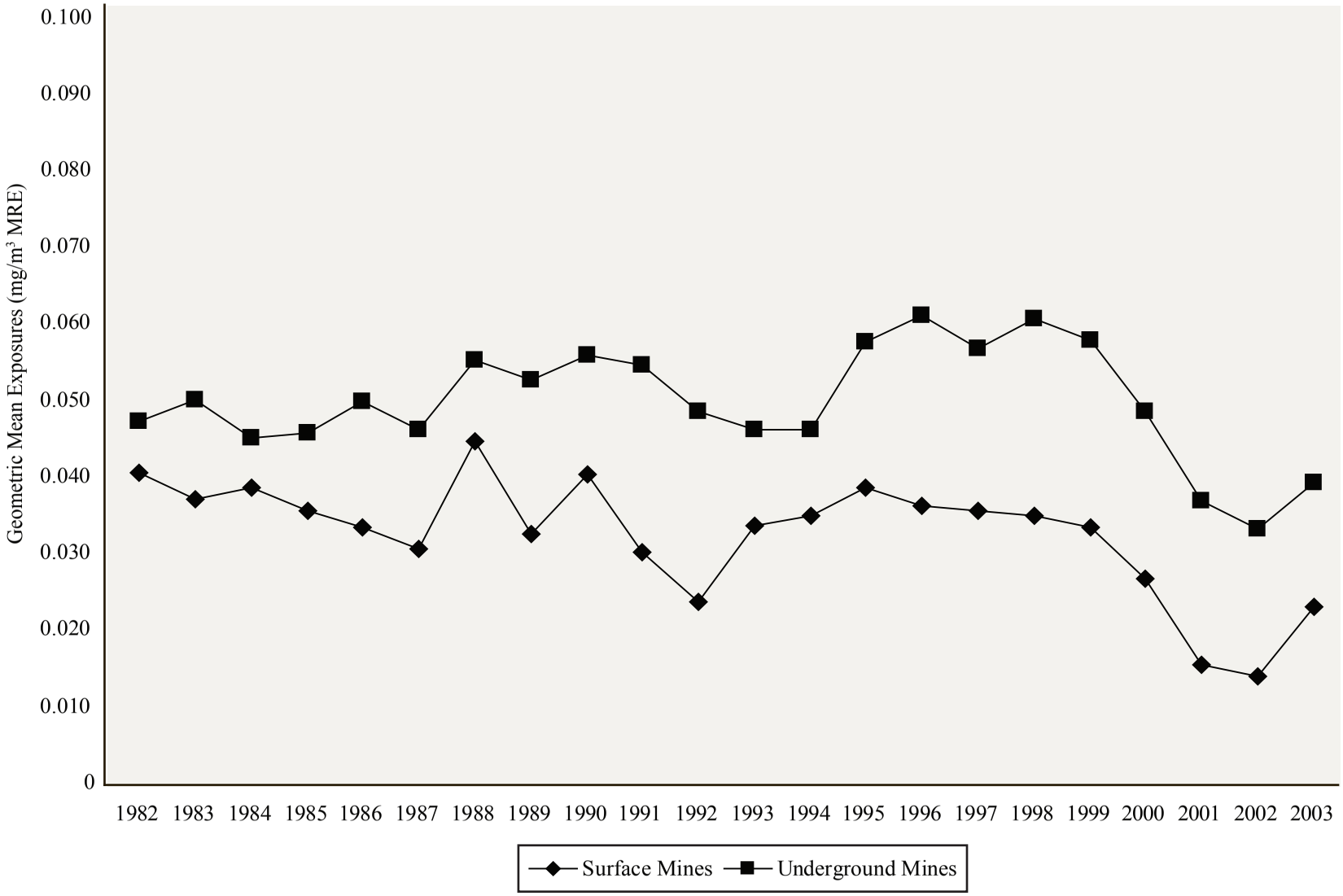
- indicates no cases reported. COC - Census Occupational Code n.e.c. - not elsewhere classified
NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by K Rosenman, MJ Reilly, and D Kalinowski (Michigan); D Valiante, D Schill, and K McGreevy (New Jersey); and E Socie and A Migliozzi (Ohio).

Table 3-15b. Silicosis: Primary occupations associated with silica exposure of silicosis cases—California, 2000–2002

Occupation (COC)	**No.**	**%**
Managerial and professional specialty	**6**	**4.5**
Technical, sales, and administrative	**2**	**1.5**
Farming, forestry and fishing	**3**	**2.2**
Precision production, craft, and repair	**53**	**39.6**
Mining machine operators (616)	14	10.4
Brickmasons and stonemasons (563)	5	3.7
All others within this grouping	34	25.4
Operators, fabricators, and laborers	**42**	**31.3**
Laborers, except construction (889)	7	5.2
Construction laborers (869)	5	3.7
All others within this grouping	30	22.4
Unclassifiable and miscellaneous unemployed	**28**	**20.9**
TOTAL	**134**	**100.0**

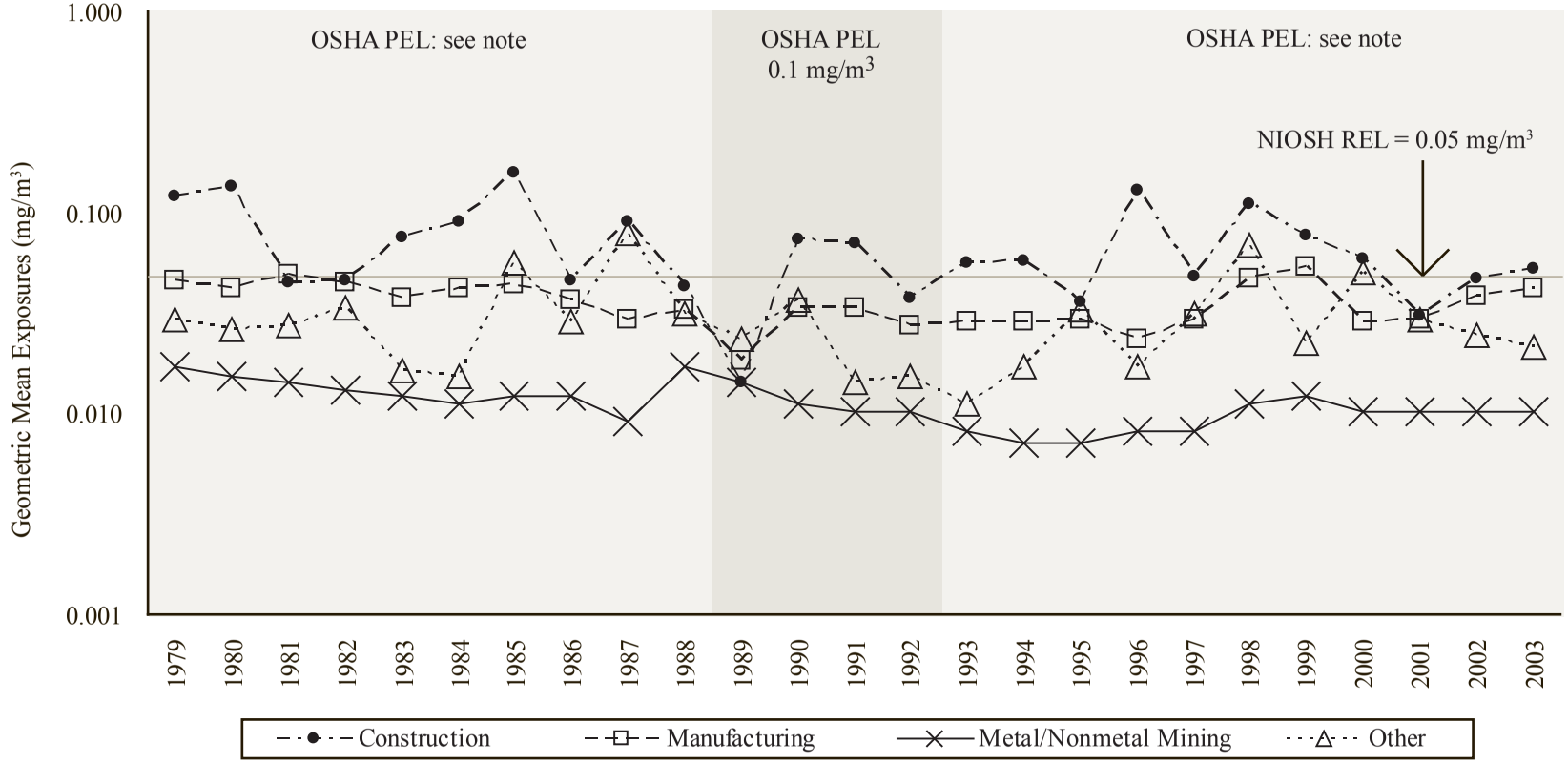
COC - 1990 Census Occupational Code
NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of December 2006, reported by R Harrison and F Reinisch.

Figure 3-5a. Respirable quartz: Geometric mean exposures in coal mining, MSHA inspector and mine operator samples, 1982–2003



PEL - permissible exposure limit REL - recommended exposure limit mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment
MSHA - Mine Safety and Health Administration
NOTE: The MSHA PEL is 2 mg/m^3 MRE for respirable dust containing less than or equal to 5 percent quartz. The PEL is adjusted using the formula [(10 mg/m^3 MRE) / (% quartz)] for respirable dust containing greater than 5 percent quartz. See appendices for source description, methods, and agents.
SOURCE: MSHA coal mine inspector and mine operator quartz data.

Figure 3-5b. Respirable quartz: Geometric mean exposures by major industry division, MSHA and OSHA samples, 1979–2003



PEL - permissible exposure limit REL - recommended exposure limit mg/m^3 - milligrams per cubic meter MSHA - Mine Safety and Health Administration
OSHA - Occupational Safety and Health Administration
NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m^3) / (% quartz + 2)], for respirable dust containing at least 1 percent quartz. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.1 mg/m^3 for respirable quartz. For metal/nonmetal mining, the MSHA PEL is [(10 mg/m^3) / (% quartz+2)] for respirable dust containing at least 1 percent quartz. See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal data. OSHA Integrated Management Information System.

Table 3-16a. Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits in coal mining, MSHA inspector and mine operator samples, 1982–2003

	Underground Mines			Surface Mines		
Year	GM (mg/m^3 MRE)	No. of Samples	% > PEL*	GM (mg/m^3 MRE)	No. of Samples	% > PEL*
1982	0.047	2,144	36.7	0.040	538	46.1
1983	0.050	3,972	38.5	0.037	990	44.2
1984	0.045	3,622	39.3	0.038	991	44.4
1985	0.045	3,500	35.3	0.035	742	41.5
1986	0.050	3,354	38.2	0.033	867	38.1
1987	0.046	3,279	36.3	0.030	728	33.4
1988	0.055	3,584	35.3	0.044	968	37.0
1989	0.052	3,210	37.1	0.032	699	35.2
1990	0.056	3,079	34.7	0.040	680	37.1
1991	0.054	4,647	33.8	0.030	410	27.8
1992	0.048	6,493	28.2	0.023	1,308	21.6
1993	0.046	5,556	25.4	0.033	1,228	29.8
1994	0.046	5,591	27.0	0.035	1,208	30.5
1995	0.057	5,802	31.1	0.038	1,369	26.5
1996	0.061	3,996	31.3	0.036	1,485	21.0
1997	0.056	5,573	29.1	0.035	1,921	20.4
1998	0.060	7,361	28.5	0.035	1,913	20.4
1999	0.057	9,291	26.6	0.033	2,121	18.6
2000	0.048	9,105	21.4	0.026	1,951	15.7
2001	0.037	12,328	15.5	0.015	4,763	6.2
2002	0.033	9,951	13.2	0.014	3,748	5.7
2003	0.039	5,909	15.4	0.023	1,156	11.2

- incalculable SIC - Standard Industrial Classification PEL - permissible exposure limit REL - recommended exposure limit
GM - geometric mean mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment
MSHA - Mine Safety and Health Administration
* Samples selected based on the respirable dust level and MSHA PEL (2 mg/m^3 MRE or adjusted PEL).
NOTE: The MSHA PEL is 2 mg/m^3 MRE for respirable dust containing less than or equal to 5 percent quartz. The PEL is adjusted using the formula [(10 mg/m^3 MRE) / (% quartz)] for respirable dust containing greater than 5 percent quartz. See appendices for source description, methods, and agents.
SOURCE: MSHA coal mine inspector and mine operator quartz data.

Table 3-16b. Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by major industry division, MSHA and OSHA samples, 1979–2003

OSHA PEL (mg/m^3)	Year	Construction (SIC 15–17)				Manufacturing (SIC 20–39)				Metal/Nonmetal Mining (SIC 10, 14)				Other (SIC 1–9, 13, 40–99)			
		GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL*	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL
See note	**1979**	0.118	27	55.6	63.0	0.045	763	30.0	49.0	0.017	9,038	11.7	17.3	0.029	36	13.9	36.1
	1980	0.133	71	59.2	67.6	0.041	1,394	30.8	47.5	0.015	6,001	11.2	17.7	0.026	36	16.7	22.2
	1981	0.044	26	38.5	50.0	0.048	1,269	33.2	50.9	0.014	6,299	11.7	17.8	0.027	15	13.3	26.7
	1982	0.045	36	27.8	44.4	0.044	1,298	30.5	48.7	0.013	2,553	11.1	16.8	0.033	15	20.0	26.7
	1983	0.074	56	41.1	64.3	0.037	1,067	26.9	42.4	0.012	6,048	10.5	16.5	0.016	30	10.0	20.0
	1984	0.089	43	44.2	51.2	0.041	863	32.3	47.5	0.011	7,118	10.2	15.4	0.015	43	14.0	23.3
	1985	0.156	57	59.6	64.9	0.043	1,144	33.6	48.9	0.012	6,002	10.3	15.4	0.055	26	38.5	57.7
	1986	0.045	35	34.3	37.1	0.036	719	26.7	39.5	0.012	6,625	10.3	16.5	0.028	40	27.5	37.5
	1987	0.089	39	51.3	64.1	0.029	804	24.9	36.6	0.009	6,069	7.8	11.5	0.077	79	50.6	58.2
	1988	0.042	44	38.6	43.2	0.032	720	28.9	40.4	0.017	7,062	17.8	26.7	0.031	75	30.7	38.7
0.1	**1989**	0.014	16	12.5	18.8	0.018	644	14.0	25.0	0.014	8,307	14.7	22.1	0.023	70	22.9	28.6
	1990	0.073	41	31.7	48.8	0.033	808	21.9	40.1	0.011	10,512	11.1	16.7	0.036	43	27.9	37.2
	1991	0.069	44	31.8	40.9	0.033	757	21.3	39.8	0.010	12,495	9.4	14.2	0.014	51	3.9	21.6
	1992	0.037	65	23.1	35.4	0.027	720	14.4	33.1	0.010	12,244	9.2	14.7	0.015	43	7.0	11.6
See note	**1993**	0.055	30	33.3	56.7	0.028	525	18.1	31.6	0.008	10,382	7.3	11.3	0.011	34	2.9	8.8
	1994	0.057	21	38.1	61.9	0.028	439	23.5	35.8	0.007	15,940	5.6	8.6	0.017	55	9.1	12.7
	1995	0.035	36	25.0	27.8	0.029	410	23.9	36.3	0.007	12,594	5.5	8.4	0.032	43	27.9	30.2
	1996	0.126	67	49.3	62.7	0.023	435	18.6	26.0	0.008	16,251	6.2	9.2	0.017	48	10.4	16.7
	1997	0.047	109	33.0	46.8	0.029	536	22.9	34.7	0.008	7,855	6.4	10.2	0.031	38	15.8	23.7
	1998	0.109	143	51.7	62.9	0.046	678	36.0	50.1	0.011	4,488	6.6	12.7	0.068	28	32.1	60.7
	1999	0.076	171	48.5	59.1	0.053	665	36.2	54.7	0.012	4,883	8.0	15.9	0.022	52	21.2	25.0
	2000	0.058	131	40.5	48.1	0.028	422	19.0	31.3	0.010	8,406	5.7	10.8	0.049	24	33.3	33.3
	2001	0.030	136	25.7	36.0	0.029	346	21.7	31.5	0.010	6,133	6.8	13.6	0.029	35	11.4	22.9
	2002	0.046	133	24.1	41.4	0.038	290	26.6	38.3	0.010	7,463	5.6	11.7	0.024	40	17.5	30.0
	2003	0.052	96	35.4	43.8	0.041	328	30.5	41.2	0.010	8,932	6.1	11.7	0.021	34	14.7	23.5

SIC - Standard Industrial Classification PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
*For metal/nonmetal mining, the MSHA PEL is [(10 mg/m^3) / (% quartz+2)] for respirable dust containing at least 1 percent quartz.
NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m^3) / (% quartz + 2)], for respirable dust containing at least 1 percent quartz. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.1 mg/m^3 for respirable quartz. The NIOSH REL is 0.05 mg/m^3. See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.

Table 3-17 (page 1 of 2). Respirable quartz: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003

CIC	Industry	Number of Samples	GM (mg/m^3)	% > PEL	% > REL
892	Miscellaneous professional and related services	10	0.679	60.0	60.0
311	Farm machinery and equipment	32	0.059	50.0	59.4
271	Iron and steel foundries	1,625	0.049	33.9	50.0
060	Construction	1,073	0.059	37.9	49.7
331	Machinery, except electrical, n.e.c.	182	0.045	35.7	49.5
282	Fabricated structural metal products	126	0.073	37.3	47.6
530	Machinery, equipment, and supplies	19	0.051	21.1	47.4
360	Ship and boat building and repairing	13	0.098	46.2	46.2
751	Automotive repair and related services	24	0.068	41.7	45.8
262	Miscellaneous nonmetallic mineral and stone products	581	0.041	28.6	45.4
252	Structural clay products	245	0.038	29.8	45.3
261	Pottery and related products	157	0.043	26.1	45.2
041	Coal mining	103,326	0.040	21.1†	‡
211	Other rubber products, and plastics footwear and belting	41	0.027	26.8	41.5
351	Motor vehicles and motor vehicle equipment	98	0.030	30.6	38.8
300	Miscellaneous fabricated metal products	207	0.039	28.0	36.2
502	Lumber and construction materials	42	0.035	19.0	33.3
312	Construction and material handling machines	29	0.034	20.7	31.0
250	Glass and glass products	73	0.018	17.8	28.8
191	Agricultural chemicals	21	0.023	14.3	28.6
280	Other primary metal industries	213	0.024	19.2	27.7
251	Cement, concrete, gypsum, and plaster products	550	0.022	17.8	26.7
231	Sawmills, planning mills, and millwork	19	0.025	26.3	26.3
760	Miscellaneous repair services	29	0.023	17.2	24.1
371	Scientific and controlling instruments	13	0.017	15.4	23.1
682	Miscellaneous retail stores	13	0.020	15.4	23.1
212	Miscellaneous plastics products	57	0.016	8.8	22.8
190	Paints, varnishes, and related products	27	0.016	14.8	22.2
372	Medical, dental, optical instruments and supplies	18	0.014	16.7	22.2

See footnotes at end of table.

Table 3-17 (page 2 of 2). Respirable quartz: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003

CIC	Industry	Number of Samples	GM (mg/m^3)	% > PEL	% > REL
391	Miscellaneous manufacturing industries	74	0.020	10.8	21.6
471	Sanitary services	33	0.023	12.1	21.2
272	Primary aluminum industries	194	0.019	11.9	21.1
180	Plastics, synthetics, and resins	20	0.014	10.0	20.0
531	Scrap and waste materials	20	0.018	10.0	20.0
990	Industry not reported	71	0.011	11.3	19.7
241	Miscellaneous wood products	21	0.016	4.8	19.0
192	Industrial and miscellaneous chemicals	103	0.019	12.6	18.4
040	Metal mining	6,590	0.012	10.2	16.9
232	Wood buildings and mobile homes	12	0.016	16.7	16.7
411	Warehousing and storage	13	0.017	15.4	15.4
201	Miscellaneous petroleum and coal products	54	0.013	9.3	14.8
270	Blast furnaces, steelworks, rolling and finishing mill	32	0.016	9.4	12.5
291	Metal forgings and stampings	24	0.016	8.3	12.5
050	Nonmetallic mining and quarrying, except fuel	96,694	0.008	5.9	10.1
320	Metalworking machinery	35	0.010	5.7	8.6
580	Lumber and building material retailing	12	0.010	0.0	8.3
281	Cutlery, handtools, and general hardware	14	0.011	7.1	7.1
410	Trucking service	14	0.010	0.0	7.1
342	Electrical machinery, equipment, and supplies, n.e.c.	32	0.010	3.1	6.3
	All other industries*	324	0.016	10.8	16.4
	TOTAL	**213,249**	**0.019**	**14.1**	**27.2**

CIC - Census Industry Code PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean
mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment n.e.c. - not elsewhere classified
MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
* includes industries with no samples exceeding the REL or industries with less than 10 samples.
† Geometric mean reported in mg/m^3 MRE. Samples selected based on the respirable dust level and MSHA PEL (2 mg/m^3 MRE or adjusted PEL).
‡ The MSHA respirable coal mine quartz exposure data and the NISOH REL for respirable quartz cannot be compared to each other because they are based on difference sampling criteria.
NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m^3) /(% quartz + 2)], for respirable dust containing at least 1 percent quartz. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.1 mg/m^3 for respirable quartz. For coal mining, the MSHA PEL is 2 mg/m^3 MRE for respirable dust containing less than or equal to 5 percent quartz. The PEL is adjusted using the formula [(10 mg/m^3 MRE) / (% quartz)] for respirable dust containing greater than 5 percent quartz; for metal/nonmetal mining, the MSHA PEL is [(10 mg/m^3) / (% quartz + 2)] for respirable dust containing at least 1 percent quartz. The NIOSH REL is 0.05 mg/m^3. See appendices forsource description, methods, and industry codes.
SOURCE: MSHA metal/nonmetal and coal mine inspector and mine operator quartz data. OSHA Integrated Management Information System.

Table 3-18 (page 1 of 3). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits in coal mining by MSHA coal mine district and state, MSHA inspector and mine operator samples, 1982–2003

	All years		1982–1988			1989–1992			1993–2003		
MSHA Coal Mine District	No. of Samples	(GM mg/m^3 MRE)	No. of Samples	(GM mg/m^3 MRE)	% > PEL*	No. of Samples	(GM mg/m^3 MRE)	% > PEL*	No. of Samples	(GM mg/m^3 MRE)	% > PEL*
District 1 (Anthracite coal mining regions in Pennsylvania)	**2,185**	**0.017**	**299**	**0.021**	**38.8**	**171**	**0.021**	**37.4**	**1,715**	**0.017**	**17.4**
District 2 (Bituminous coal mining regions in Pennsylvania)	**16,941**	**0.035**	**3,843**	**0.042**	**33.7**	**2,207**	**0.039**	**23.2**	**10,891**	**0.032**	**14.7**
District 3	**15,753**	**0.031**	**3,680**	**0.031**	**27.7**	**1,684**	**0.037**	**20.7**	**10,389**	**0.030**	**14.2**
Maryland	1,108	0.034	120	0.056	40.0	45	0.037	4.4	943	0.032	12.8
Ohio	5,356	0.034	1,871	0.038	32.2	719	0.036	21.7	2,766	0.031	14.6
Northern West Virginia	9,289	0.029	1,689	0.024	21.8	920	0.038	20.7	6,680	0.029	14.2
District 4 (Southern West Virginia)	**27,718**	**0.053**	**6,802**	**0.051**	**39.1**	**3,900**	**0.055**	**35.8**	**17,016**	**0.053**	**27.5**
District 5 (Virginia)	**17,991**	**0.051**	**4,264**	**0.056**	**44.3**	**2,795**	**0.057**	**36.6**	**10,932**	**0.048**	**22.0**
District 6 (Eastern Kentucky)	**21,839**	**0.050**	**2,706**	**0.050**	**39.8**	**2,529**	**0.066**	**41.2**	**16,604**	**0.048**	**24.3**
District 7	**21,732**	**0.050**	**2,729**	**0.067**	**49.0**	**3,008**	**0.056**	**36.4**	**15,995**	**0.046**	**23.5**
Northern Georgia	0	-	0	-	-	0	-	-	0	-	-
Central Kentucky	19,421	0.050	2,232	0.069	50.2	2,486	0.058	37.2	14,703	0.046	23.4
North Carolina	0	-	0	-	-	0	-	-	0	-	-
South Carolina	0	-	0	-	-	0	-	-	0	-	-
Tennessee	2,311	0.048	497	0.057	43.3	522	0.050	32.6	1,292	0.045	23.6
District 8	**9,722**	**0.041**	**2,004**	**0.046**	**33.5**	**1,414**	**0.040**	**19.9**	**6,304**	**0.040**	**22.3**
Illinois	7,913	0.040	1,616	0.046	32.3	1,262	0.039	18.8	5,035	0.038	20.4
Indiana	1,717	0.049	330	0.051	37.9	140	0.053	30.7	1,247	0.048	30.0
Iowa	54	0.024	39	0.023	38.5	9	0.027	22.2	6	0.022	0
Michigan	0	-	0	-	-	0	-	-	0	-	-
Minnesota	0	-	0	-	-	0	-	-	0	-	-
Northern Missouri	38	0.052	19	0.075	47.4	3	0.031	-	16	0.036	31.3
Wisconsin	0	-	0	-	-	0	-	-	0	-	-

See footnotes at end of table.

Table 3-18 (page 2 of 3). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits in coal mining by MSHA coal mine district and state, MSHA inspector and mine operator samples, 1982–2003

	All years		1982–1988			1989–1992			1993–2003		
MSHA Coal Mine District	No. of Samples	(GM mg/m^3 MRE)	No. of Samples	(GM mg/m^3 MRE)	% > PEL*	No. of Samples	(GM mg/m^3 MRE)	% > PEL*	No. of Samples	(GM mg/m^3 MRE)	% > PEL*
District 9	**7,043**	**0.029**	**1,296**	**0.038**	**40.4**	**1,210**	**0.028**	**32.6**	**4,537**	**0.027**	**16.1**
Alaska	13	0.019	10	0.014	10.0	2	0.051	50.0	1	0.056	0
Arizona	50	0.045	6	0.023	33.3	10	0.050	40.0	34	0.049	14.7
Arkansas	19	0.043	6	0.120	66.7	1	0.009	100.0	12	0.029	16.7
California	1	0.025	0	-	-	0	-	-	1	0.025	0
Colorado	2,227	0.031	424	0.039	42.9	380	0.030	34.2	1,423	0.030	16.0
Hawaii	0	-	0	-	-	0	-	-	0	-	-
Idaho	0	-	0	-	-	0	-	-	0	-	-
Kansas	32	0.044	8	0.120	75.0	7	0.027	0	17	0.034	5.9
Louisiana	27	0.008	0	-	-	2	0.038	0	25	0.007	-
Southern Missouri	59	0.038	14	0.096	57.1	4	0.077	25.0	41	0.026	9.8
Montana	136	0.027	34	0.036	38.2	11	0.048	54.5	91	0.022	20.9
Nebraska	0	-	0	-	-	0	-	-	0	-	-
Nevada	0	-	0	-	-	0	-	-	0	-	-
New Mexico	425	0.034	113	0.050	35.4	42	0.052	38.1	270	0.027	12.6
North Dakota	57	0.009	27	0.011	11.1	14	0.008	14.3	16	0.009	6.3
Oklahoma	423	0.057	149	0.118	61.1	62	0.065	38.7	212	0.033	17.9
Oregon	0	-	0	-	-	0	-	-	0	-	-
Texas	162	0.027	48	0.095	56.3	24	0.015	25.0	90	0.016	13.3
Utah	2,667	0.027	292	0.029	34.9	549	0.025	32.1	1,826	0.027	16.4
Washington	23	0.027	2	0.017	0	9	0.019	0	12	0.038	16.7
Wyoming	722	0.020	163	0.016	27.6	93	0.019	29.0	466	0.021	18.2

See footnotes at end of table.

Table 3-18 (page 3 of 3). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits in coal mining by MSHA coal mine district and state, MSHA inspector and mine operator samples, 1982–2003

	All years		1982–1988			1989–1992			1993–2003		
MSHA Coal Mine District	No. of Samples	(GM mg/m^3 MRE)	No. of Samples	(GM mg/m^3 MRE)	% > PEL*	No. of Samples	(GM mg/m^3 MRE)	% > PEL*	No. of Samples	(GM mg/m^3 MRE)	% > PEL*
District 10 (Western Kentucky)	**6,973**	**0.022**	**1,137**	**0.020**	**25.7**	**904**	**0.022**	**18.1**	**4,932**	**0.022**	**12.4**
District 11	**5,234**	**0.041**	**519**	**0.053**	**36.8**	**704**	**0.058**	**33.0**	**4,011**	**0.038**	**18.8**
Alabama	5,234	0.041	519	0.053	36.8	704	0.058	33.0	4,011	0.038	18.8
Florida	0	-	0	-	-	0	-	-	0	-	-
Central and Southern Georgia	0	-	0	-	-	0	-	-	0	-	-
Mississippi	0	-	0	-	-	0	-	-	0	-	-
Puerto Rico	0	-	0	-	-	0	-	-	0	-	-
Virgin Islands	0	-	0	-	-	0	-	-	0	-	-
TOTAL	**153,131**	**0.042**	**29,279**	**0.046**	**37.8**	**20,526**	**0.047**	**31.9**	**103,326**	**0.040**	**21.1**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
MRE - Mining Research Establishment MSHA - Mine Safety and Health Administration
* Samples selected based on the respirable dust level and MSHA PEL (2 mg/m^3 MRE or adjusted PEL).
NOTE: The MSHA PEL is 2 mg/m^3 MRE for respirable dust containing less than or equal to 5 percent quartz. The PEL is adjusted using the formula [(10 mg/m^3 MRE) / (% quartz)] for respirable dust containing greater than 5 percent quartz. See appendices for source description and methods.
SOURCE: MSHA coal mine inspector and mine operator quartz data.

Table 3-19 (page 1 of 2). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA metal/nonmetal mine district and state, MSHA samples, 1979–2003

MSHA Metal/Nonmetal Mine District	All years		1979–1988				1989–1992				1993–2003			
	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
Northeast	**33,331**	**0.011**	**8,979**	**0.016**	**12.4**	**19.4**	**6,060**	**0.011**	**9.9**	**16.1**	**18,292**	**0.009**	**6.2**	**11.4**
Connecticut	904	0.012	285	0.027	26.3	38.2	156	0.013	13.5	23.1	463	0.007	1.7	5.6
Delaware	114	0.005	17	0.006	0.0	0.0	33	0.005	0.0	3.0	64	0.004	3.1	0.0
District of Columbia	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Maine	940	0.012	199	0.025	16.6	24.6	169	0.009	3.0	7.7	572	0.011	5.4	12.1
Maryland	1,736	0.008	518	0.009	4.2	8.1	314	0.007	2.9	7.0	904	0.008	2.8	5.9
Massachusetts	1,669	0.013	476	0.026	17.4	28.6	250	0.010	9.6	16.0	943	0.009	5.1	10.5
New Hampshire	738	0.012	131	0.029	15.3	33.6	133	0.010	7.5	16.5	474	0.010	5.7	13.5
New Jersey	2,780	0.012	992	0.021	17.5	27.5	623	0.012	12.4	20.1	1,165	0.008	4.2	8.8
New York	7,618	0.010	1,875	0.014	11.4	17.0	1,649	0.009	6.2	11.8	4,094	0.009	5.2	9.9
Pennsylvania	7,918	0.012	2,324	0.014	9.3	15.2	1,212	0.014	13.8	20.5	4,382	0.011	7.6	13.2
Rhode Island	262	0.016	57	0.030	22.8	36.8	35	0.014	8.6	25.7	170	0.014	12.4	20.6
Vermont	1,859	0.016	372	0.020	22.3	31.5	334	0.013	19.2	26.3	1,153	0.016	16.7	28.9
Virginia	5,012	0.009	1,126	0.011	6.6	12.0	808	0.009	8.5	13.2	3,078	0.008	4.0	7.5
West Virginia	1,781	0.014	607	0.018	17.6	24.4	344	0.015	13.7	19.8	830	0.010	7.0	11.6
Southeast	**43,316**	**0.008**	**13,902**	**0.010**	**7.5**	**12.4**	**9,250**	**0.008**	**8.2**	**12.8**	**20,164**	**0.007**	**4.9**	**8.6**
Alabama	3,736	0.007	1,034	0.007	4.2	6.6	876	0.007	8.0	11.9	1,826	0.007	5.5	8.8
Florida	3,938	0.005	830	0.006	3.7	7.1	827	0.005	2.2	5.0	2,281	0.004	1.8	2.7
Georgia	6,815	0.010	2,464	0.015	11.1	19.6	1,567	0.010	10.6	15.3	2,784	0.008	6.3	9.8
Kentucky	2,905	0.008	943	0.009	7.5	10.4	480	0.008	9.4	11.0	1,482	0.007	4.4	6.1
Mississippi	2,058	0.007	273	0.007	4.4	6.6	476	0.007	5.5	8.2	1,309	0.008	5.8	9.8
North Carolina	9,183	0.008	3,347	0.010	6.5	11.4	2,166	0.008	6.7	11.1	3,670	0.007	4.6	8.6
Puerto Rico	1,380	0.005	586	0.004	0.9	0.2	29	0.007	3.4	10.3	765	0.005	3.1	3.4
South Carolina	4,549	0.010	1,054	0.017	17.3	27.6	1,130	0.010	9.7	16.1	2,365	0.007	3.8	8.7
Tennessee	8,663	0.009	3,327	0.009	6.4	9.9	1,698	0.010	10.5	16.3	3,638	0.009	6.9	12.8
Virgin Islands	89	0.006	44	0.004	0.0	0.0	1	0.010	0.0	0.0	44	0.010	2.3	6.8
North Central	**40,993**	**0.010**	**12,515**	**0.011**	**9.3**	**13.8**	**8,549**	**0.011**	**10.8**	**15.8**	**19,929**	**0.009**	**5.4**	**9.6**
Illinois	7,193	0.011	2,796	0.014	16.4	21.0	1,387	0.011	13.0	19.3	3,010	0.008	5.2	9.6
Indiana	4,440	0.007	1,174	0.007	2.9	3.3	917	0.007	4.5	6.0	2,349	0.007	3.1	5.4
Iowa	2,498	0.006	675	0.007	4.9	5.0	570	0.006	5.3	4.9	1,253	0.006	2.6	4.2
Michigan	5,746	0.011	1,397	0.012	8.4	15.3	1,459	0.014	14.3	19.9	2,890	0.010	6.8	11.7
Minnesota	7,915	0.010	3,402	0.010	5.7	10.6	1,475	0.012	10.5	17.0	3,038	0.009	5.5	10.1
Ohio	7,638	0.010	1,361	0.013	13.2	19.2	1,710	0.010	9.1	14.4	4,567	0.009	6.3	11.1
Wisconsin	5,563	0.011	1,710	0.012	8.9	13.3	1,031	0.013	15.1	20.5	2,822	0.009	5.7	10.7

See footnotes at end of table.

Table 3-19 (page 2 of 2). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA metal/nonmetal mine district and state, MSHA samples, 1979–2003

MSHA Metal/Nonmetal Mine District	All years		1979–1988				1989–1992				1993–2003			
	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
South Central	**36,806**	**0.009**	**7,465**	**0.013**	**13.0**	**17.6**	**9,403**	**0.010**	**9.5**	**13.7**	**19,938**	**0.007**	**5.4**	**8.4**
Arkansas	2,805	0.014	544	0.039	31.6	45.8	660	0.018	16.7	28.5	1,601	0.009	8.2	14.7
Louisiana	3,019	0.006	279	0.008	7.2	11.8	716	0.005	4.2	6.3	2,024	0.006	3.9	6.9
Missouri	9,055	0.010	2,347	0.013	13.0	16.4	2,008	0.011	11.6	15.1	4,700	0.008	5.2	8.4
New Mexico	4,338	0.013	1,013	0.015	14.4	19.7	1,059	0.015	13.2	21.1	2,266	0.012	11.8	16.7
Oklahoma	5,512	0.009	1,570	0.011	9.9	13.2	1,340	0.011	10.9	16.6	2,602	0.008	4.5	8.9
Texas	12,077	0.007	1,712	0.011	10.0	14.1	3,620	0.007	6.4	8.4	6,745	0.006	3.4	4.2
Rocky Mountain	**34,698**	**0.015**	**15,364**	**0.017**	**14.5**	**22.2**	**5,927**	**0.017**	**16.7**	**26.2**	**13,407**	**0.013**	**11.2**	**18.2**
Arizona	5,644	0.017	2,380	0.023	18.0	27.1	717	0.019	18.8	29.0	2,547	0.012	10.2	16.8
Colorado	6,528	0.016	3,459	0.014	12.6	19.9	1,168	0.019	17.4	27.6	1,901	0.018	12.6	23.3
Kansas	2,970	0.011	1,280	0.013	12.4	14.1	542	0.011	9.8	12.5	1,148	0.009	7.1	8.6
Montana	3,334	0.014	1,370	0.012	10.4	15.3	667	0.023	22.5	33.7	1,297	0.013	12.1	20.9
Nebraska	861	0.006	53	0.006	5.7	5.7	254	0.006	2.8	4.7	554	0.006	3.1	3.8
Nevada	4,114	0.020	1,224	0.025	24.5	33.7	1,032	0.021	20.4	31.8	1,858	0.017	15.3	25.0
North Dakota	582	0.011	194	0.014	12.9	18.6	72	0.009	1.4	11.1	316	0.010	5.7	12.3
South Dakota	2,688	0.015	1,597	0.019	13.2	23.0	281	0.013	9.3	16.0	810	0.011	9.6	15.3
Utah	4,744	0.016	2,083	0.015	12.6	20.0	889	0.020	18.2	30.4	1,772	0.015	11.5	21.9
Wyoming	3,233	0.015	1,724	0.021	15.1	26.4	305	0.013	13.8	21.0	1,204	0.010	14.1	13.6
Western	**20,556**	**0.010**	**4,590**	**0.016**	**13.5**	**20.7**	**4,369**	**0.013**	**12.1**	**19.1**	**11,597**	**0.008**	**5.4**	**9.1**
Alaska	450	0.014	88	0.025	21.6	28.4	33	0.054	24.2	39.4	329	0.011	6.4	14.6
California	9,059	0.013	2,326	0.018	15.3	23.3	2,425	0.014	12.0	21.0	4,308	0.010	7.0	11.2
Hawaii	320	0.004	11	0.005	0.0	0.0	57	0.005	3.5	1.8	252	0.004	1.2	0.8
Idaho	3,238	0.015	912	0.022	15.9	26.1	534	0.017	17.0	27.2	1,792	0.011	8.0	15.9
Oregon	3,464	0.005	413	0.007	4.1	6.3	698	0.007	7.4	8.0	2,353	0.005	1.9	1.8
Washington	4,025	0.008	840	0.011	10.1	13.8	622	0.011	13.3	17.8	2,563	0.007	4.6	7.5
TOTAL	**209,700**	**0.010**	**62,815**	**0.013**	**11.4**	**17.3**	**43,558**	**0.011**	**10.8**	**16.5**	**103,327**	**0.009**	**6.2**	**10.6**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
MSHA - Mine Safety and Health Administration
NOTE: For metal/nonmetal mining, the MSHA PEL is [(10 mg/m^3) / (% quartz+2)] for respirable dust containing at least 1 percent quartz. The NIOSH REL is 0.05 mg/m^3. See appendices for source description and methods.
SOURCE: MSHA metal/nonmetal mine data.

Table 3-20 (page 1 of 3). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	All years		1979–1988 OSHA PEL: see note				1989–1992 OSHA PEL=0.1 mg/m^3				1993–2003 OSHA PEL: see note			
OSHA Region	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
Region 1	**1,692**	**0.029**	**1,006**	**0.032**	**25.2**	**39.2**	**187**	**0.017**	**9.6**	**21.9**	**499**	**0.028**	**22.8**	**34.7**
Connecticut	514	0.021	354	0.026	18.6	32.8	56	0.014	3.6	16.1	104	0.015	8.7	20.2
Maine	39	0.019	21	0.029	33.3	38.1	1	0.007	0.0	0.0	17	0.012	5.9	11.8
Massachusetts	601	0.038	300	0.040	31.0	45.3	77	0.025	16.9	29.9	224	0.041	29.9	44.2
New Hampshire	298	0.024	143	0.033	23.8	39.9	41	0.015	7.3	22.0	114	0.018	15.8	23.7
Rhode Island	240	0.039	188	0.036	28.7	41.0	12	0.007	0.0	0.0	40	0.096	47.5	60.0
Vermont	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Region 2	**2,075**	**0.038**	**1,001**	**0.040**	**31.6**	**46.4**	**300**	**0.029**	**17.7**	**36.7**	**774**	**0.039**	**31.7**	**43.9**
New Jersey	584	0.033	318	0.035	29.6	41.8	138	0.038	18.8	45.7	128	0.025	21.9	26.6
New York	1,476	0.040	681	0.042	32.3	48.3	158	0.024	17.1	29.7	637	0.044	33.9	47.7
Puerto Rico	11	0.027	2	0.914	100.0	100.0	3	0.007	0.0	0.0	6	0.016	16.7	33.3
Virgin Islands	4	0.007	0	-	-	-	1	0.007	0.0	0.0	3	0.007	0.0	0.0
Region 3	**2,846**	**0.047**	**1,994**	**0.047**	**30.1**	**49.3**	**304**	**0.034**	**23.7**	**39.8**	**548**	**0.054**	**36.1**	**51.5**
Delaware	23	0.019	17	0.014	5.9	11.8	0	-	-	-	6	0.044	33.3	33.3
District of Columbia	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Maryland	247	0.032	127	0.032	28.3	36.2	62	0.035	35.5	50.0	58	0.030	20.7	29.3
Pennsylvania	2,061	0.049	1,394	0.049	29.4	51.7	220	0.033	20.5	37.3	447	0.057	38.0	53.2
Virginia	280	0.041	252	0.038	26.6	40.1	3	0.041	0.0	33.3	25	0.084	28.0	76.0
West Virginia	235	0.061	204	0.062	42.2	55.9	19	0.049	26.3	36.8	12	0.057	58.3	50.0
Region 4	**3,223**	**0.031**	**1,501**	**0.036**	**29.0**	**42.0**	**524**	**0.030**	**20.8**	**35.3**	**1,198**	**0.026**	**19.5**	**31.8**
Alabama	663	0.029	354	0.033	30.2	42.1	167	0.043	26.3	50.3	142	0.014	8.5	15.5
Florida	121	0.038	59	0.034	28.8	37.3	22	0.027	22.7	27.3	40	0.054	42.5	50.0
Georgia	750	0.040	477	0.041	32.9	47.4	96	0.022	15.6	26.0	177	0.049	22.6	42.4
Kentucky	359	0.029	155	0.045	33.5	45.2	62	0.046	29.0	41.9	142	0.015	13.4	16.2
Mississippi	114	0.047	75	0.046	33.3	49.3	22	0.030	13.6	22.7	17	0.096	41.2	64.7
North Carolina	587	0.027	157	0.026	12.1	26.1	27	0.026	18.5	29.6	403	0.027	21.3	33.3
South Carolina	230	0.022	66	0.018	21.2	22.7	68	0.019	16.2	25.0	96	0.030	21.9	32.3
Tennessee	399	0.029	158	0.041	28.5	44.9	60	0.019	13.3	23.3	181	0.025	17.7	35.9

See footnotes at end of table.

Table 3-20 (page 2 of 3). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	All years		1979–1988 OSHA PEL: see note				1989–1992 OSHA PEL=0.1 mg/m^3				1993–2003 OSHA PEL: see note			
OSHA Region	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
Region 5	**6,233**	**0.037**	**2,863**	**0.048**	**34.9**	**52.5**	**1,251**	**0.028**	**16.4**	**35.3**	**2,119**	**0.032**	**25.6**	**36.7**
Illinois	1,188	0.039	546	0.043	33.5	47.4	191	0.031	18.3	35.6	451	0.039	28.8	39.5
Indiana	503	0.030	262	0.037	31.3	45.0	79	0.019	8.9	25.3	162	0.027	27.2	35.2
Michigan	915	0.015	29	0.013	0.0	3.4	264	0.012	2.7	12.1	622	0.016	9.0	18.2
Minnesota	75	0.059	60	0.067	50.0	65.0	9	0.029	0.0	44.4	6	0.047	33.3	33.3
Ohio	1,995	0.043	1,219	0.046	32.1	49.9	366	0.031	18.6	34.7	410	0.048	31.7	44.4
Wisconsin	1,557	0.055	747	0.061	41.9	64.1	342	0.050	25.7	55.8	468	0.049	38.5	52.6
Region 6	**1,294**	**0.041**	**887**	**0.036**	**30.0**	**41.5**	**172**	**0.037**	**29.1**	**43.6**	**235**	**0.075**	**40.4**	**50.2**
Arkansas	124	0.031	96	0.023	24.0	32.3	15	0.089	66.7	66.7	13	0.072	53.8	53.8
Louisiana	97	0.074	68	0.056	41.2	64.7	11	0.032	27.3	36.4	18	0.336	44.4	66.7
New Mexico	27	0.071	11	0.041	54.5	54.5	1	0.007	0.0	0.0	15	0.124	80.0	80.0
Oklahoma	233	0.040	154	0.034	20.1	37.7	10	0.044	30.0	50.0	69	0.058	33.3	49.3
Texas	813	0.039	558	0.037	31.9	41.0	135	0.034	25.2	41.5	120	0.065	37.5	44.2
Region 7	**1,256**	**0.036**	**742**	**0.036**	**26.7**	**39.8**	**236**	**0.022**	**12.3**	**27.1**	**278**	**0.052**	**35.3**	**47.1**
Iowa	592	0.032	336	0.031	22.6	32.7	119	0.021	12.6	28.6	137	0.050	40.9	48.9
Kansas	250	0.051	97	0.041	34.0	42.3	51	0.030	17.6	27.5	102	0.079	36.3	56.9
Missouri	333	0.036	242	0.048	31.4	50.4	62	0.019	8.1	22.6	29	0.013	6.9	6.9
Nebraska	81	0.027	67	0.023	19.4	32.8	4	0.033	0.0	50.0	10	0.068	30.0	40.0
Region 8	**868**	**0.040**	**511**	**0.031**	**23.5**	**34.8**	**122**	**0.032**	**25.4**	**39.3**	**235**	**0.075**	**40.9**	**55.7**
Colorado	541	0.031	328	0.026	20.4	30.2	74	0.025	17.6	32.4	139	0.055	33.8	51.8
Montana	78	0.059	64	0.044	25.0	35.9	11	0.250	72.7	81.8	3	0.141	66.7	66.7
North Dakota	108	0.082	56	0.041	23.2	50.0	2	0.069	50.0	50.0	50	0.183	64.0	72.0
South Dakota	73	0.055	27	0.033	33.3	44.4	10	0.102	70.0	70.0	36	0.068	36.1	47.2
Utah	62	0.044	31	0.085	48.4	48.4	25	0.017	8.0	28.0	6	0.076	33.3	66.7
Wyoming	6	0.025	5	0.022	0.0	20.0	0	-	-	-	1	0.046	0.0	0.0

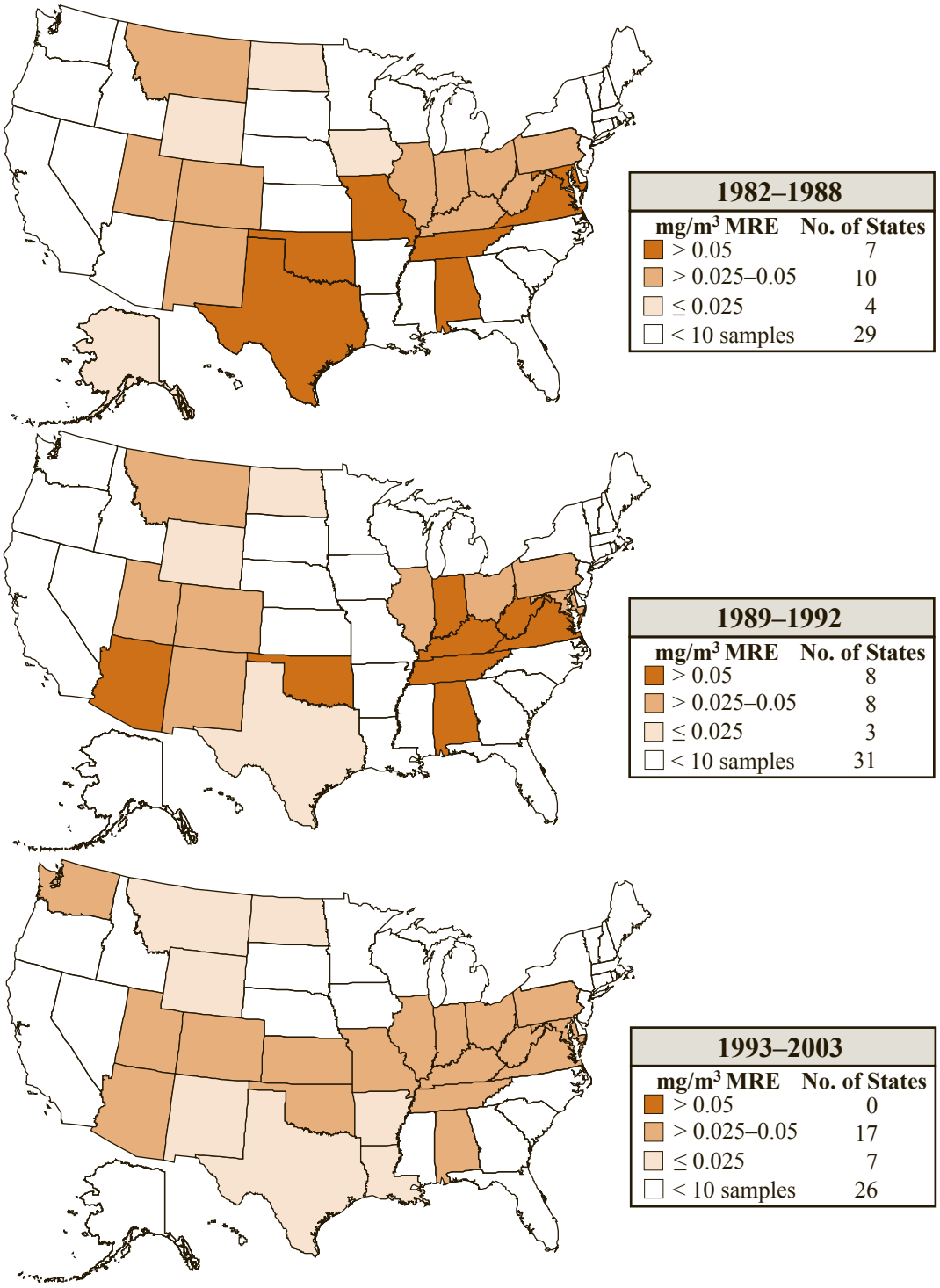
See footnotes at end of table.

Table 3-20 (page 3 of 3). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	All years		1979–1988 OSHA PEL: see note				1989–1992 OSHA PEL=0.1 mg/m^3				1993–2003 OSHA PEL: see note			
OSHA Region	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
Region 9	**523**	**0.039**	**246**	**0.058**	**44.3**	**55.3**	**119**	**0.020**	**19.3**	**21.8**	**158**	**0.035**	**28.5**	**39.9**
American Samoa	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Arizona	76	0.052	29	0.055	41.4	58.6	10	0.010	0.0	10.0	37	0.078	51.4	62.2
California	283	0.024	119	0.025	22.7	35.3	61	0.014	6.6	9.8	103	0.031	22.3	35.9
Guam	1	0.007	1	0.007	0.0	0.0	0	-	-	-	0	-	-	-
Hawaii	10	0.008	5	0.008	0.0	0.0	0	-	-	-	5	0.007	0.0	0.0
Nevada	153	0.097	92	0.205	76.1	83.7	48	0.035	39.6	39.6	13	0.021	23.1	23.1
Region 10	**769**	**0.038**	**130**	**0.046**	**33.1**	**40.8**	**87**	**0.034**	**21.8**	**32.2**	**552**	**0.037**	**25.2**	**38.6**
Alaska	7	0.100	2	0.150	50.0	50.0	5	0.085	60.0	80.0	0	-	-	-
Idaho	42	0.041	18	0.055	50.0	55.6	21	0.040	14.3	42.9	3	0.007	0.0	0.0
Oregon	348	0.025	107	0.046	30.8	39.3	5	0.009	0.0	0.0	236	0.019	18.2	24.2
Washington	372	0.055	3	0.007	0.0	0.0	56	0.033	23.2	26.8	313	0.061	30.7	49.8
TOTAL	**20,779**	**0.037**	**10,881**	**0.041**	**30.7**	**46.0**	**3,302**	**0.028**	**18.4**	**34.5**	**6,596**	**0.036**	**27.4**	**39.6**

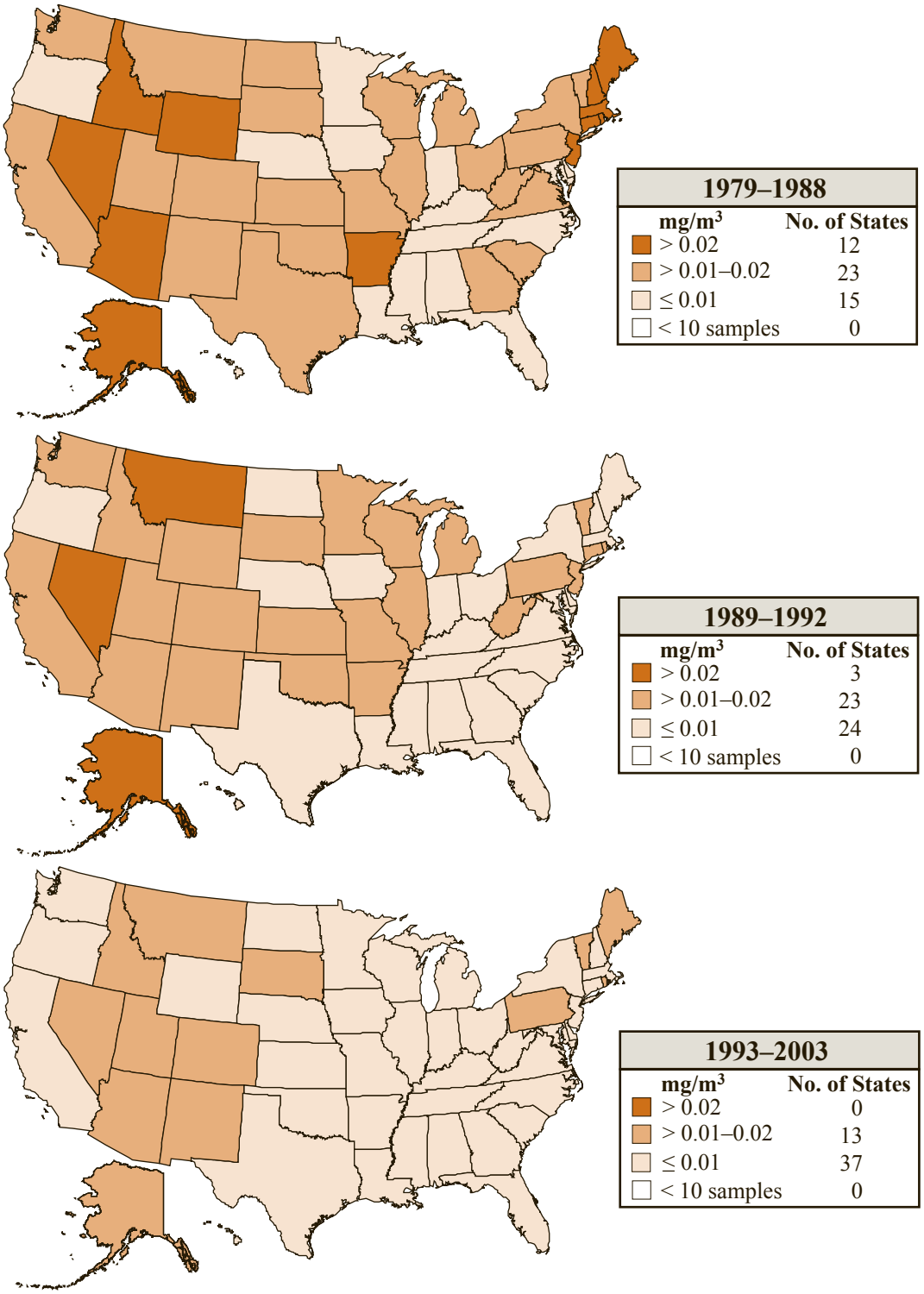
- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
OSHA - Occupational Safety and Health Administration
NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m^3) /(% quartz + 2)] for respirable dust containing at least 1 percent quartz. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.1 mg/m^3 for respirable quartz. The NIOSH REL is 0.05mg/m^3. See appendices for source description and mehtods.
SOURCE: OSHA Integrated Management Information System.

Figure 3-6. Respirable quartz: Geometric mean coal mining exposures by state, MSHA inspector and mine operator samples, 1982–2003



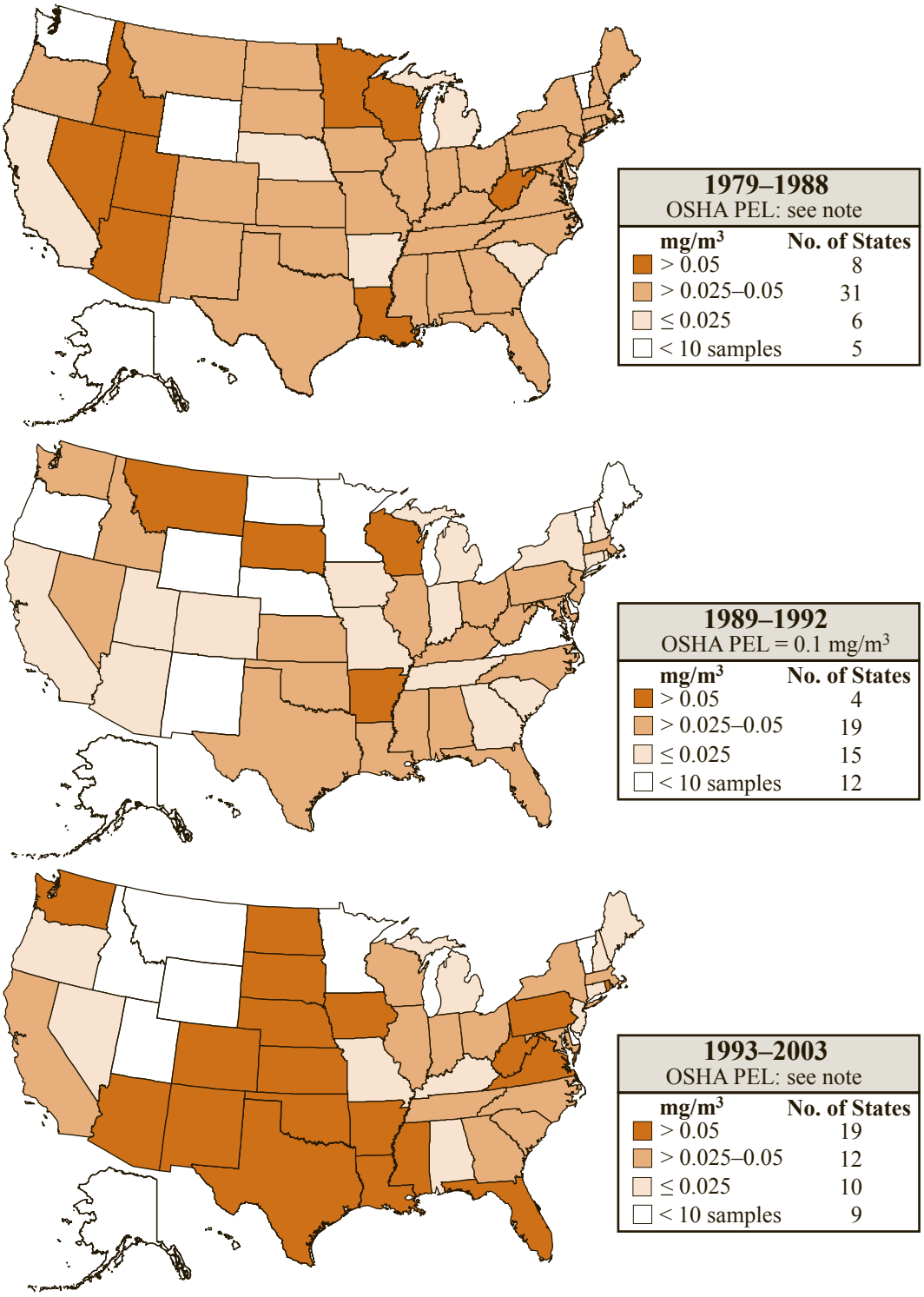
mg/m^3 - milligrams per cubic meter MRE - Mining Research Establishment
MSHA - Mine Safety and Health Administration
NOTE: See appendices for source description, methods, and agents.
SOURCE: MSHA coal mine inspector and operator quartz data.

Figure 3-7. Respirable quartz: Geometric mean metal/nonmetal mining exposures by state, MSHA samples, 1979–2003



mg/m^3 - milligrams per cubic meter MSHA - Mine Safety and Health Administration
NOTE: See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data.

Figure 3-8. Respirable quartz: Geometric mean exposures by state, OSHA samples, 1979–2003



PEL - permissible exposure limit mg/m^3 - milligrams per cubic meter OSHA - Occupational Safety and Health Administration

NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m^3) /(% quartz + 2)] for respirable dust containing at least 1 percent quartz. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.1 mg/m^3 for respirable quartz. See appendices for source description, methods, and agents.

SOURCE: OSHA Integrated Management Information System.

Table 3-21. Respirable cristobalite: Geometric mean exposures and percent exceeding designated occupational exposure limits, MSHA and OSHA samples, 1979–2003

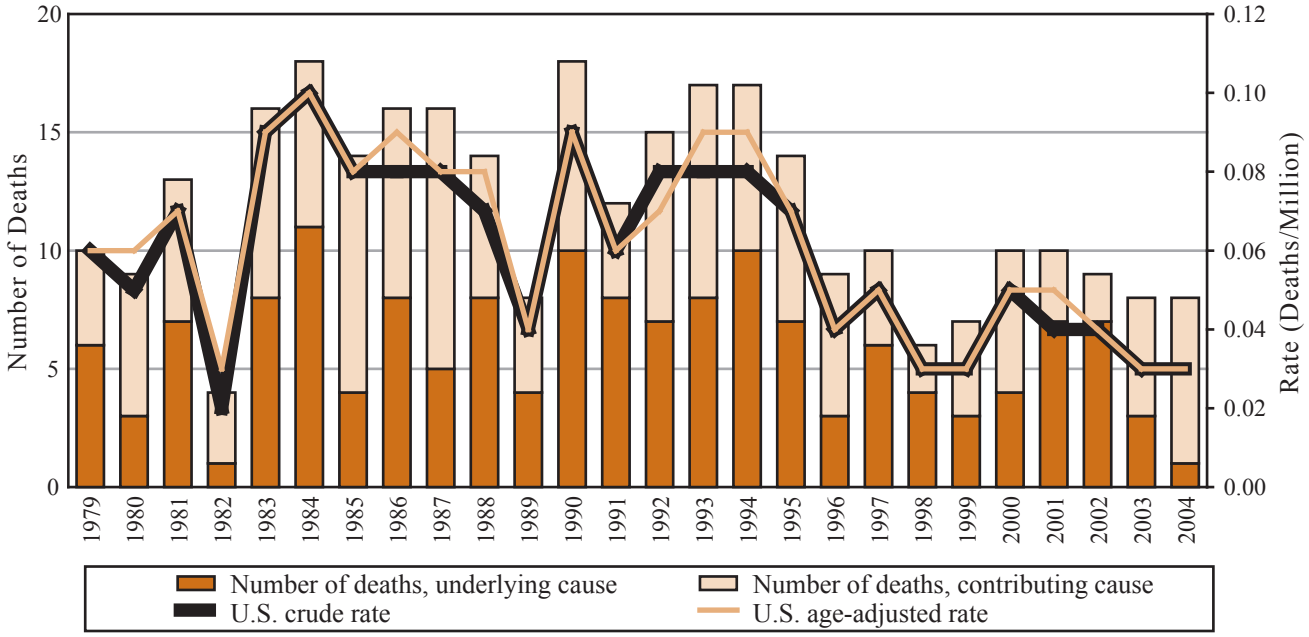
OSHA PEL (mg/m^3)	Year	Cristobalite, respirable - MSHA				Cristobalite, respirable - OSHA			
		GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL
See note	**1979**	0.056	12	58.3	50.0	0.030	34	14.7	14.7
	1980	0.050	53	54.7	43.4	0.020	193	0.0	0.0
	1981	0.032	21	42.9	28.6	0.022	101	3.0	3.0
	1982	0.060	5	100.0	60.0	0.022	84	4.8	4.8
	1983	0.039	34	44.1	23.5	0.027	26	7.7	7.7
	1984	0.036	26	23.1	15.4	0.020	68	1.5	1.5
	1985	0.025	23	26.1	13.0	0.025	116	9.5	8.6
	1986	0.026	10	10.0	10.0	0.021	78	2.6	2.6
	1987	0.032	14	14.3	14.3	0.020	72	1.4	1.4
	1988	0.028	22	31.8	22.7	0.019	82	1.2	1.2
0.05	**1989**	0.033	28	28.6	21.4	0.020	127	1.6	1.6
	1990	0.038	19	52.6	36.8	0.020	124	4.0	4.0
	1991	0.029	13	46.2	30.8	0.023	73	6.8	6.8
	1992	0.021	22	9.1	0.0	0.020	179	1.7	1.7
See note	**1993**	0.032	23	30.4	26.1	0.021	82	3.7	3.7
	1994	0.066	12	66.7	50.0	0.028	66	15.2	15.2
	1995	0.033	3	0.0	0.0	0.023	54	11.1	11.1
	1996	0.020	12	8.3	8.3	0.022	45	4.4	4.4
	1997	0.030	7	28.6	28.6	0.020	84	4.8	3.6
	1998	0.015	5	0.0	0.0	0.019	32	0.0	0.0
	1999	0.010	1	0.0	0.0	0.021	54	7.4	7.4
	2000	0.031	8	50.0	50.0	0.025	60	13.3	13.3
	2001	0.020	1	0.0	0.0	0.027	40	15.0	15.0
	2002	0.000	0	-	-	0.024	25	4.0	4.0
	2003	0.036	10	20.0	20.0	0.027	50	10.0	10.0

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean
mg/m^3 - milligrams per cubic meter MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(5 mg/m^3) / (% cristobalite + 2)], for respirable dust containing at least 1 percent cristobalite. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.05 mg/m^3 for respirable cristobalite. For metal/nonmetal mining, the MSHA PEL is [(5 mg/m^3) / (% cristobalite + 2)] for respirable dust containing at least 1 percent cristobalite. The NIOSH REL is 0.05 mg/m^3. See appendices for source description and methods.
SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.

Section 4

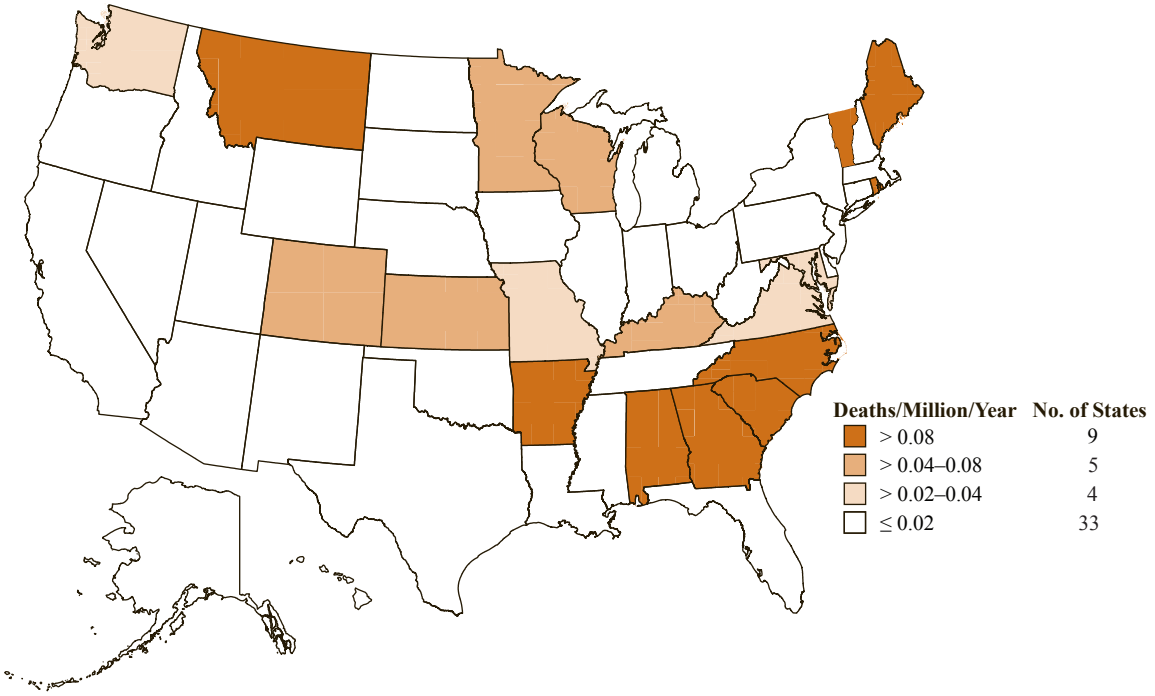
Byssinosis and Related Exposures

Figure 4-1. Byssinosis: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1979–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 4-2. Byssinosis: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 4-1. Byssinosis: Number of deaths by sex, race, and age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	14	50.0	11	3	14	-	-	-	1	1	-	-	6	6	-	74
1996	9	33.3	4	5	9	-	-	-	-	-	1	2	2	4	-	71
1997	10	60.0	9	1	9	1	-	-	-	-	-	1	3	4	2	76
1998	6	66.7	5	1	6	-	-	-	-	-	-	1	1	3	1	77
1999	7	42.9	3	4	7	-	-	-	-	1	-	1	2	2	1	68
2000	10	40.0	8	2	10	-	-	-	1	-	-	2	1	3	3	78
2001	10	70.0	6	4	10	-	-	-	-	-	-	-	3	4	3	80
2002	9	77.8	5	4	9	-	-	-	-	-	2	1	1	3	2	78
2003	8	37.5	6	2	7	1	-	-	-	-	1	1	-	3	3	83
2004	8	12.5	4	4	7	1	-	-	-	-	-	1	1	2	4	84
TOTAL	**91**	**49.5**	**61**	**30**	**88**	**3**	**-**	**-**	**2**	**2**	**4**	**10**	**20**	**34**	**19**	**77**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data

Table 4-2. Byssinosis: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1995	0.07	0.13	0.03	-	-	-	-
1996	0.04	0.05	0.06	-	-	-	-
1997	0.05	0.09	0.01	0.09	-	-	-
1998	0.03	0.06	0.01	-	-	-	-
1999	0.03	0.03	0.04	-	-	-	-
2000	0.05	0.09	0.02	-	-	-	-
2001	0.04	0.07	0.04	-	-	-	-
2002	0.04	0.05	0.04	-	-	-	-
2003	0.03	0.06	0.01	-	0.07	-	-
2004	0.03	0.03	0.04	0.07	-	-	-
1995–2004	**0.04**	**0.07**	**0.03**	**0.02**	**0.01**	**-**	**-**
			Age-Adjusted Death Rate				
1995	0.07	0.14	0.03	-	-	-	-
1996	0.04	0.05	0.05	-	-	-	-
1997	0.05	0.11	0.01	0.18	-	-	-
1998	0.03	0.07	0.01	-	-	-	-
1999	0.03	0.03	0.03	-	-	-	-
2000	0.05	0.11	0.02	-	-	-	-
2001	0.05	0.08	0.03	-	-	-	-
2002	0.04	0.06	0.03	-	-	-	-
2003	0.03	0.07	0.01	-	0.08	-	-
2004	0.03	0.03	0.03	0.20	-	-	-
1995–2004	**0.04**	**0.07**	**0.02**	**0.04**	**0.01**	**-**	**-**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 4-3. Byssinosis: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	60	-	-	-	-	-	60
1996	5	20	-	-	-	-	25
1997	5	-	-	-	-	-	5
1998	5	-	-	-	-	-	5
1999	30	-	-	-	-	-	30
2000	45	-	-	-	-	-	45
2001	-	-	-	-	-	-	-
2002	20	15	-	-	-	-	35
2003	20	-	-	-	-	-	20
2004	5	-	-	-	-	-	5
TOTAL	**195**	**35**	**-**	**-**	**-**	**-**	**230**
	Years of Potential Life Lost to Life Expectancy						
1995	167	40	-	-	-	-	207
1996	47	88	-	-	-	-	135
1997	85	7	7	-	-	-	99
1998	48	16	-	-	-	-	64
1999	70	40	-	-	-	-	110
2000	124	18	-	-	-	-	142
2001	61	32	-	-	-	-	93
2002	78	55	-	-	-	-	133
2003	79	7	-	8	-	-	94
2004	43	31	6	-	-	-	80
TOTAL	**802**	**334**	**13**	**8**	**-**	**-**	**1,157**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 4-4. Byssinosis: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	-	-	1	-	-	1	1	-	1	-	**4**
Alaska	-	-	-	-	-	-	-	-	-	-	**-**
Arizona	-	-	-	-	-	-	-	-	-	-	**-**
Arkansas	-	1	-	-	-	-	1	-	-	-	**2**
California	1	-	1	-	1	-	-	-	-	-	**3**
Colorado	-	-	-	-	1	1	-	-	-	-	**2**
Connecticut	-	-	-	-	-	-	-	-	-	-	**-**
Delaware	-	-	-	-	-	-	-	-	-	-	**-**
District of Columbia	-	-	-	-	-	-	-	-	-	-	**-**
Florida	-	-	1	-	-	-	1	1	-	-	**3**
Georgia	1	1	1	2	1	-	1	-	1	-	**8**
Hawaii	-	-	-	-	-	-	-	-	-	-	**-**
Idaho	-	-	-	-	-	-	-	-	-	-	**-**
Illinois	-	-	-	-	-	-	-	1	-	-	**1**
Indiana	-	-	-	-	-	-	-	-	-	-	**-**
Iowa	-	-	-	-	-	-	-	-	-	-	**-**
Kansas	-	-	-	-	-	-	-	-	-	1	**1**
Kentucky	1	-	-	-	-	-	-	-	1	-	**2**
Louisiana	-	-	-	-	-	-	-	-	-	-	**-**
Maine	-	-	-	-	-	-	-	-	1	-	**1**
Maryland	1	-	-	-	-	-	-	-	-	-	**1**
Massachusetts	-	-	-	-	-	-	-	-	-	-	**-**
Michigan	-	-	-	-	-	-	-	1	-	-	**1**
Minnesota	-	-	2	-	-	-	-	-	-	-	**2**
Mississippi	-	-	-	-	-	-	-	-	-	-	**-**
Missouri	1	-	-	-	-	-	-	-	-	-	**1**
Montana	-	-	-	-	-	-	1	-	-	-	**1**
Nebraska	-	-	-	-	-	-	-	-	-	-	**-**
Nevada	-	-	-	-	-	-	-	-	-	-	**-**
New Hampshire	-	-	-	-	-	-	-	-	-	-	**-**
New Jersey	-	-	-	-	-	-	-	-	-	1	**1**
New Mexico	-	-	-	-	-	-	-	-	-	-	**-**
New York	-	-	-	-	-	1	-	-	1	-	**2**
North Carolina	8	4	-	3	1	5	4	4	3	4	**36**
North Dakota	-	-	-	-	-	-	-	-	-	-	**-**
Ohio	-	-	-	-	-	-	-	-	-	-	**-**
Oklahoma	-	-	-	-	-	-	-	-	-	-	**-**
Oregon	-	-	-	-	-	-	-	-	-	-	**-**
Pennsylvania	-	-	-	-	1	-	-	1	-	-	**2**
Rhode Island	-	1	-	-	-	-	-	-	-	-	**1**
South Carolina	1	1	1	1	1	1	1	-	-	1	**8**
South Dakota	-	-	-	-	-	-	-	-	-	-	**-**
Tennessee	-	-	-	-	-	-	-	-	-	-	**-**
Texas	-	1	1	-	-	-	-	-	-	-	**2**
Utah	-	-	-	-	-	-	-	-	-	-	**-**
Vermont	-	-	-	-	1	-	-	-	-	-	**1**
Virginia	-	-	-	-	-	1	-	1	-	-	**2**
Washington	-	-	-	-	-	-	-	-	-	1	**1**
West Virginia	-	-	-	-	-	-	-	-	-	-	**-**
Wisconsin	-	-	2	-	-	-	-	-	-	-	**2**
Wyoming	-	-	-	-	-	-	-	-	-	-	**-**
TOTAL	**14**	**9**	**10**	**6**	**7**	**10**	**10**	**9**	**8**	**8**	**91**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 4-5. Byssinosis: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	4	4	0.11	7	0.11	6	36	7	9.1	16
Alaska	-	-	-	-	-	-	-	-	-	-
Arizona	-	-	-	-	-	-	-	-	-	-
Arkansas	2	7	0.09	9	0.09	8	17	15	8.6	19
California	3	5	0.01	21	0.01	21	23	13	7.7	24
Colorado	2	7	0.06	10	0.05	12	87	3	43.6	1
Connecticut	-	-	-	-	-	-	-	-	-	-
Delaware	-	-	-	-	-	-	-	-	-	-
District of Columbia	-	-	-	-	-	-	-	-	-	-
Florida	3	5	0.02	16	0.02	17	24	12	7.9	23
Georgia	8	2	0.13	5	0.17	4	91	2	11.4	14
Hawaii	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	-	-	-	-
Illinois	1	16	0.01	21	0.01	21	22	14	22.0	4
Indiana	-	-	-	-	-	-	-	-	-	-
Iowa	-	-	-	-	-	-	-	-	-	-
Kansas	1	16	0.05	12	0.05	12	15	17	15.1	9
Kentucky	2	7	0.06	10	0.06	10	78	4	39.1	2
Louisiana	-	-	-	-	-	-	-	-	-	-
Maine	1	16	0.10	8	0.09	8	9	22	9.0	18
Maryland	1	16	0.02	16	0.03	16	14	19	14.1	12
Massachusetts	-	-	-	-	-	-	-	-	-	-
Michigan	1	16	0.01	21	0.01	21	30	10	30.3	3
Minnesota	2	7	0.05	12	0.06	10	36	7	17.9	6
Mississippi	-	-	-	-	-	-	-	-	-	-
Missouri	1	16	0.02	16	0.02	17	8	24	8.3	22
Montana	1	16	0.14	4	0.13	5	15	17	14.6	10
Nebraska	-	-	-	-	-	-	-	-	-	-
Nevada	-	-	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	-
New Jersey	1	16	0.01	21	0.01	21	7	26	6.8	25
New Mexico	-	-	-	-	-	-	-	-	-	-
New York	2	7	0.01	21	0.01	21	13	21	6.6	26
North Carolina	36	1	0.56	1	0.60	1	461	1	12.8	13
North Dakota	-	-	-	-	-	-	-	-	-	-
Ohio	-	-	-	-	-	-	-	-	-	-
Oklahoma	-	-	-	-	-	-	-	-	-	-
Oregon	-	-	-	-	-	-	-	-	-	-
Pennsylvania	2	7	0.02	16	0.02	17	30	10	15.2	8
Rhode Island	1	16	0.12	6	0.10	7	8	24	8.4	21
South Carolina	8	2	0.25	2	0.28	2	76	5	9.5	15
South Dakota	-	-	-	-	-	-	-	-	-	-
Tennessee	-	-	-	-	-	-	-	-	-	-
Texas	2	7	0.01	21	0.01	21	36	7	17.8	7
Utah	-	-	-	-	-	-	-	-	-	-
Vermont	1	16	0.20	3	0.21	3	14	19	14.3	11
Virginia	2	7	0.04	15	0.04	15	37	6	18.3	5
Washington	1	16	0.02	16	0.02	17	9	22	9.1	16
West Virginia	-	-	-	-	-	-	-	-	-	-
Wisconsin	2	7	0.05	12	0.05	12	17	15	8.5	20
Wyoming	-	-	-	-	-	-	-	-	-	-

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 4-6. Byssinosis: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
142	Yarn, thread, and fabric mills	39	48.2
961	Non-paid worker or non-worker or own home/at home	7	8.6
060	Construction	4	4.9
041	Coal mining	3	3.7
010	Agricultural production, crops	2	2.5
151	Apparel and accessories, except knit	2	2.5
351	Motor vehicles and motor vehicle equipment	2	2.5
392	Not specified manufacturing industries	2	2.5
831	Hospitals	2	2.5
901	General government, n.e.c.	2	2.5
	All other industries	15	18.5
	Industry not reported	1	1.2
	TOTAL	**81**	**100.0**

CIC - Census Industry Code n.e.c. - not elsewhere classified
NOTE: The comparable number of byssinosis deaths in the entire United States for this same time period was 125. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 4-7. Byssinosis: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
749	Miscellaneous textile machine operators	11	13.6
738	Winding and twisting machine operators	8	9.9
518	Industrial machinery repairers	7	8.6
914	Housewife/Homemaker	7	8.6
616	Mining machine operators	4	4.9
744	Textile sewing machine operators	4	4.9
473	Farmers, except horticulture	2	2.5
633	Supervisors, production occupations	2	2.5
637	Machinists	2	2.5
739	Knitting, looping, taping, and weaving machine operators	2	2.5
754	Packaging and filling machine operators	2	2.5
889	Laborers, except construction	2	2.5
	All other occupations	26	32.1
	Occupation not reported	2	2.5
	TOTAL	**81**	**100.0**

COC - Census Occupation Code
NOTE: The comparable number of byssinosis deaths in the entire United States for this same time period was 125. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 4-8. Byssinosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
142	Yarn, thread, and fabric mills	39	22.3	15.8	30.4

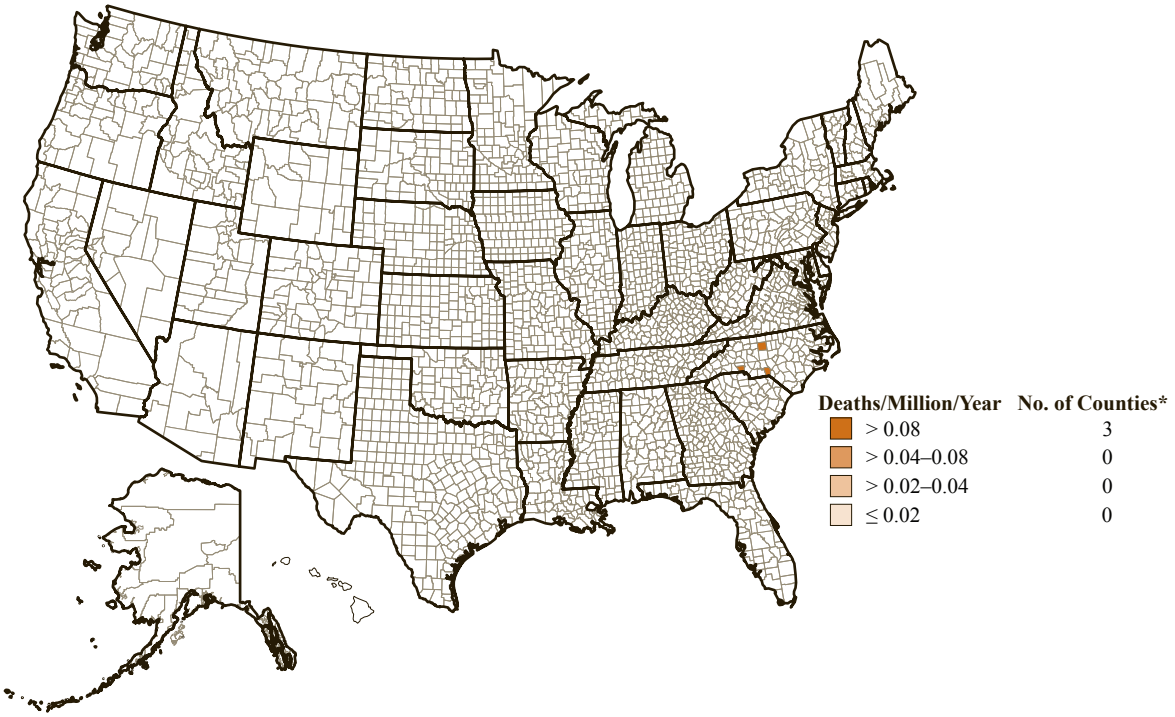
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with byssinosis reported was 81 in these same selected states and years, and the comparable number of byssinosis deaths in the entire United States for this same time period was 125. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 4-9. Byssinosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
749	Miscellaneous textile machine operators	11	35.8	17.9	64.0
518	Industrial machinery repairers	7	28.1	11.3	57.9
738	Winding and twisting machine operators	8	27.5	11.9	54.1

COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with byssinosis reported was 81 in these same selected states and years, and the comparable number of byssinosis deaths in the entire United States for this same time period was 125. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 4-3a. Byssinosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1985–1994

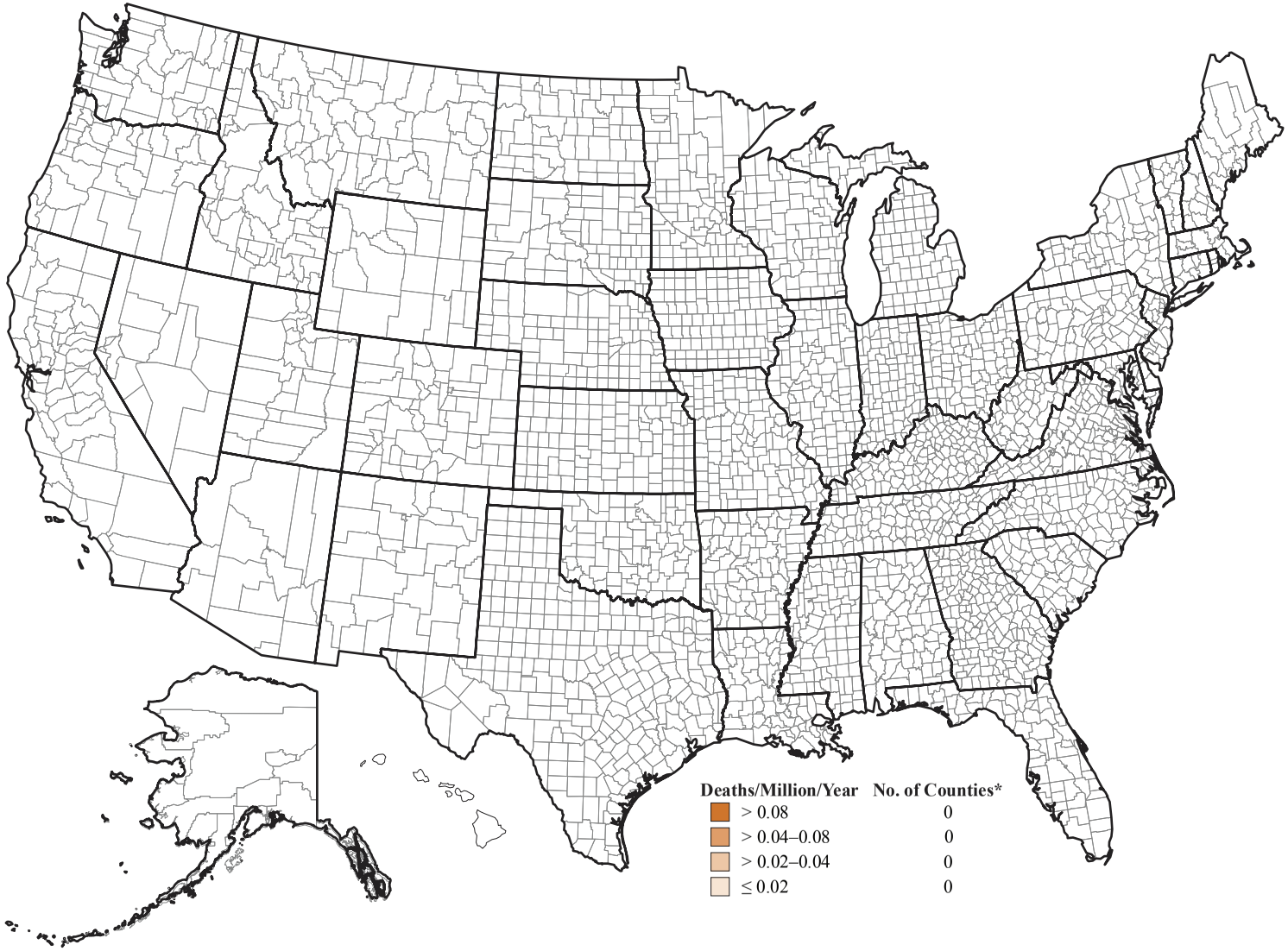


*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

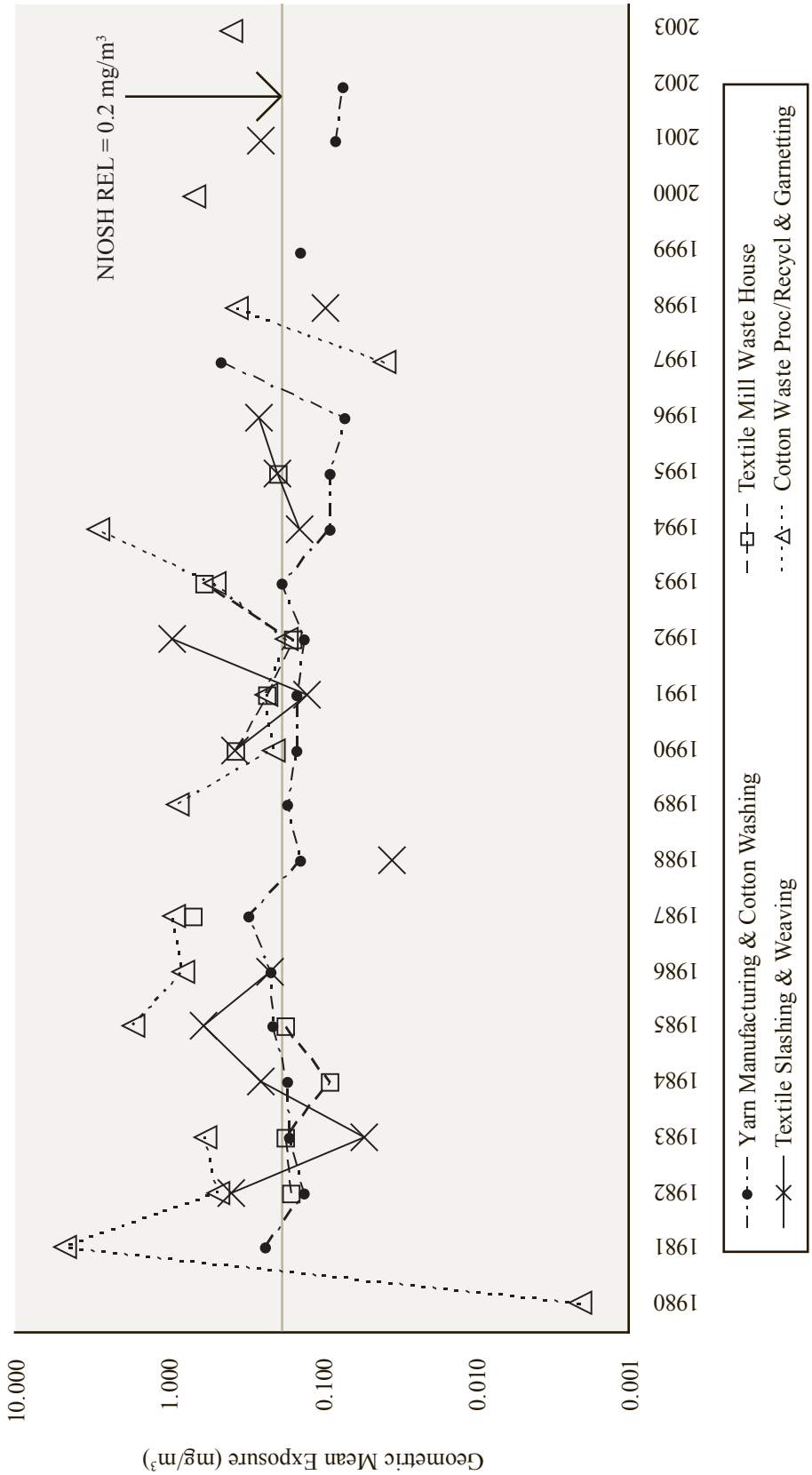
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 4-3b. Byssinosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 4-4. Cotton dust: Geometric mean exposures by cotton process, OSHA samples, 1980–2003



PEL - permissible exposure limit REL - recommended exposure limit mg/m³ - milligrams per cubic meter OSHA - Occupational Safety and Health Administration

NOTE: The OSHA PEL is 0.2 mg/m³ for yarn manufacturing and cotton washing operations, 0.5 mg/m³ for textile mill waste house operations or for dust from lower grade washed cotton used during yarn manufacturing, 0.75 mg/m³ for textile slashing and weaving operations, and 1.0 mg/m³ for cotton waste processing operations or waste recycling (i.e., sorting, blending, cleaning, and willowing) and garnetting. See appendices for source description, methods, and agents.

SOURCE: OSHA Integrated Management Information System.

Table 4-10. Cotton dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by cotton process, OSHA samples, 1980–2003

	Yarn Manufacturing & Cotton Washing (OSHA PEL = 0.2 mg/m^3) (NIOSH REL = 0.2 mg/m^3)				Textile Mill Waste House or Dust from Lower-Grade Cotton Washing During Yarn Manufacturing (OSHA PEL = 0.5 mg/m^3)				Textile Slashing and Weaving (OSHA PEL = 0.75 mg/m^3)				Cotton Waste Processing/Recycling & Garnetting (OSHA PEL = 1.0 mg/m^3)			
Year	**GM (mg/m^3)**	**No. of Samples**	**% > PEL**	**% > REL**	**GM (mg/m^3)**	**No. of Samples**	**% > PEL**	**% > REL**	**GM (mg/m^3)**	**No. of Samples**	**% > PEL**	**% > REL**	**GM (mg/m^3)**	**No. of Samples**	**% > PEL**	**% > REL**
1980	-	0	-	-	-	0	-	-	-	0	-	-	0.002	1	0.0	0.0
1981	0.233	7	57.1	57.1	-	0	-	-	-	0	-	-	4.898	3	100.0	100.0
1982	0.131	67	23.9	23.9	0.157	5	0.0	40.0	0.395	12	25.0	83.3	0.485	4	25.0	100.0
1983	0.164	130	28.5	28.5	0.182	10	20.0	20.0	0.053	16	6.3	12.5	0.600	8	37.5	50.0
1984	0.170	54	40.7	40.7	0.091	8	0.0	25.0	0.248	7	14.3	71.4	-	0	-	-
1985	0.209	70	52.9	52.9	0.173	7	14.3	28.6	0.616	9	11.1	100.0	1.756	4	50.0	75.0
1986	0.217	46	43.5	43.5	-	0	-	-	0.222	4	0.0	50.0	0.821	13	23.1	100.0
1987	0.300	17	64.7	64.7	0.701	4	100.0	100.0	-	0	-	-	0.949	7	42.9	100.0
1988	0.139	35	25.7	25.7	-	0	-	-	0.040	2	0.0	0.0	-	0	-	-
1989	0.170	8	37.5	37.5	-	0	-	-	-	0	-	-	0.894	2	0.0	100.0
1990	0.147	17	23.5	23.5	0.370	1	0.0	100.0	0.384	3	0.0	100.0	0.212	2	0.0	50.0
1991	0.147	88	25.0	25.0	0.232	7	14.3	28.6	0.129	11	0.0	45.5	0.233	16	0.0	50.0
1992	0.131	104	27.9	27.9	0.157	8	0.0	25.0	0.979	4	100.0	100.0	0.173	10	0.0	30.0
1993	0.184	39	35.9	35.9	0.593	17	70.6	94.1	-	0	-	-	0.520	5	20.0	80.0
1994	0.089	36	13.9	13.9	-	0	-	-	0.131	3	0.0	66.7	3.000	1	100.0	100.0
1995	0.088	31	12.9	12.9	0.194	4	50.0	50.0	0.205	4	0.0	75.0	-	0	-	-
1996	0.071	6	0.0	0.0	-	0	-	-	0.259	5	0.0	80.0	-	0	-	-
1997	0.465	4	100.0	100.0	-	0	-	-	-	0	-	-	0.040	3	0.0	0.0
1998	-	0	-	-	-	0	-	-	0.095	6	0.0	33.3	0.371	2	0.0	100.0
1999	0.136	7	14.3	14.3	-	0	-	-	-	0	-	-	-	0	-	-
2000	-	0	-	-	-	0	-	-	-	0	-	-	0.704	9	33.3	77.8
2001	0.082	6	16.7	16.7	-	0	-	-	0.253	2	0.0	50.0	-	0	-	-
2002	0.071	30	0.0	0.0	-	0	-	-	-	0	-	-	-	0	-	-
2003	-	0	-	-	-	0	-	-	-	0	-	-	0.401	3	0.0	100.0

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
OSHA - Occupational Safety and Health Administration
NOTE: The NIOSH REL is 0.2 mg/m^3. See appendices for source description, methods, and agents.
SOURCE: OSHA Integrated Management Information System.

Table 4-11. Cotton dust: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, OSHA samples, 1995–2003

CIC	Industry	Number of Samples	GM (mg/m^3)	% > PEL	% > REL
150	Miscellaneous textile mill products	18	0.336	16.7	66.7
142	Yarn, thread, and fabric mills	103	0.089	10.7	21.4
	All other industries*	9	0.021	11.1	11.1
	TOTAL	**130**	**0.097**	**11.5**	**26.9**

CIC - Census Industry Code PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean
mg/m^3 - milligrams per cubic meter OSHA - Occupational Safety and Health Administration
* includes industries with no samples exceeding the REL or industries with less than 10 samples.
NOTE: The OSHA PEL is 0.2 mg/m^3 for yarn manufacturing and cotton washing operations, 0.5 mg/m^3 for textile mill waste house operations or for dust from lower grade washed cotton used during yarn manufacturing, 0.75 mg/m^3 for textile slashing and weaving operations, and 1.0 mg/m^3 for cotton waste processing operations or waste recycling (i.e., sorting, blending, cleaning, and willowing) and garnetting. The NIOSH REL is 0.2 mg/m^3. See appendices for source description, methods, and industry codes.
SOURCE: OSHA Integrated Management Information System.

Table 4-12 (page 1 of 3). Cotton dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region, state and process, OSHA samples, 1980–2003

	All years		1980–1989				1990–1994				1995–2003			
OSHA Region	No. of Samples	GM (mg/m^3)	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL	No. of Samples	GM (mg/m^3)	% > PEL	% > REL
Region 1	**9**	**0.048**	**0**	**-**	**-**	**-**	**3**	**0.139**	**0.0**	**0.0**	**6**	**0.028**	**0.0**	**0.0**
Massachusetts	**3**	**0.139**	**0**	**-**	**-**	**-**	**3**	**0.139**	**0.0**	**0.0**	**0**	**-**	**-**	**-**
Cotton Waste Proc/Recycl & Garnetting	3	0.139	0	-	-	-	3	0.139	0.0	0.0	0	-	-	-
New Hampshire	**6**	**0.028**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**6**	**0.028**	**0.0**	**0.0**
Yarn Manufacturing & Cotton Washing	4	0.089	0	-	-	-	0	-	-	-	4	0.089	0.0	0.0
Undetermined Process	2	0.003	0	-	-	-	0	-	-	-	2	0.003	0.0	0.0
Region 2	**10**	**1.093**	**10**	**1.093**	**50.0**	**90.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
New Jersey	**9**	**2.119**	**9**	**2.119**	**55.6**	**100.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Textile Mill Waste House	1	0.965	1	0.965	100.0	100.0	0	-	-	-	0	-	-	-
Cotton Waste Proc/Recycl & Garnetting	8	2.338	8	2.338	50.0	100.0	0	-	-	-	0	-	-	-
Puerto Rico	**1**	**0.003**	**1**	**0.003**	**0.0**	**0.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Undetermined Process	1	0.003	1	0.003	0.0	0.0	0	-	-	-	0	-	-	-
Region 3	**4**	**0.029**	**4**	**0.029**	**0.0**	**25.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Maryland	**1**	**0.014**	**1**	**0.014**	**0.0**	**0.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Undetermined Process	1	0.014	1	0.014	0.0	0.0	0	-	-	-	0	-	-	-
Pennsylvania	**3**	**0.038**	**3**	**0.038**	**0.0**	**33.3**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Textile Mill Waste House	1	0.260	1	0.260	0.0	100.0	0	-	-	-	0	-	-	-
Cotton Waste Proc/Recycl & Garnetting	1	0.072	1	0.072	0.0	0.0	0	-	-	-	0	-	-	-
Undetermined Process	1	0.003	1	0.003	0.0	0.0	0	-	-	-	0	-	-	-

See footnotes at end of table.

Table 4-12 (page 2 of 3). Cotton dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region, state and process, OSHA samples, 1980–2003

	All years		1980–1989				1990–1994				1995–2003			
OSHA Region	No. of Samples	GM (mg/m³)	No. of Samples	GM (mg/m³)	% > PEL	% > REL	No. of Samples	GM (mg/m³)	% > PEL	% > REL	No. of Samples	GM (mg/m³)	% > PEL	% > REL
Region 4	**954**	**0.133**	**470**	**0.154**	**30.2**	**37.2**	**367**	**0.123**	**22.1**	**29.7**	**117**	**0.091**	**9.4**	**24.8**
Alabama	**91**	**0.195**	**37**	**0.282**	**56.8**	**56.8**	**46**	**0.196**	**19.6**	**41.3**	**8**	**0.035**	**12.5**	**12.5**
Yarn Manufacturing & Cotton Washing	68	0.181	33	0.223	54.5	54.5	29	0.168	31.0	31.0	6	0.081	16.7	16.7
Textile Mill Waste House	3	0.154	1	0.115	0.0	0.0	2	0.179	0.0	50.0	0	-	-	-
Textile Slashing and Weaving	1	0.449	0	-	-	-	1	0.449	0.0	100.0	0	-	-	-
Cotton Waste Proc/Recycl & Garnetting	17	0.431	3	4.898	100.0	100.0	14	0.256	0.0	57.1	0	-	-	-
Undetermined Process	2	0.003	0	-	-	-	0	-	-	-	2	0.003	0.0	0.0
Georgia	**209**	**0.157**	**131**	**0.160**	**43.5**	**46.6**	**53**	**0.146**	**24.5**	**28.3**	**25**	**0.164**	**20.0**	**36.0**
Yarn Manufacturing & Cotton Washing	184	0.166	120	0.175	47.5	47.5	46	0.147	28.3	28.3	18	0.156	27.8	27.8
Textile Mill Waste House	4	0.159	1	0.098	0.0	0.0	3	0.187	0.0	0.0	0	-	-	-
Textile Slashing and Weaving	13	0.102	6	0.089	0.0	33.3	4	0.111	0.0	50.0	3	0.119	0.0	66.7
Cotton Waste Proc/Recycl & Garnetting	6	0.295	2	0.376	0.0	100.0	0	-	-	-	4	0.262	0.0	50.0
Undetermined Process	2	0.003	2	0.003	0.0	0.0	0	-	-	-	0	-	-	-
Mississippi	**1**	**0.050**	**1**	**0.050**	**0.0**	**0.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Yarn Manufacturing & Cotton Washing	1	0.050	1	0.050	0.0	0.0	0	-	-	-	0	-	-	-
North Carolina	**496**	**0.124**	**250**	**0.129**	**21.2**	**28.0**	**208**	**0.128**	**21.6**	**27.9**	**38**	**0.076**	**7.9**	**18.4**
Yarn Manufacturing & Cotton Washing	381	0.132	189	0.144	24.9	24.9	166	0.131	24.1	24.1	26	0.075	11.5	11.5
Textile Mill Waste House	27	0.118	15	0.087	0.0	13.3	11	0.201	9.1	36.4	1	0.037	0.0	0.0
Textile Slashing and Weaving	53	0.161	31	0.141	12.9	51.6	16	0.255	25.0	68.8	6	0.096	0.0	33.3
Cotton Waste Proc/Recycl & Garnetting	22	0.202	9	0.255	22.2	55.6	9	0.172	0.0	33.3	4	0.170	0.0	50.0
Undetermined Process	13	0.003	6	0.003	0.0	0.0	6	0.003	0.0	0.0	1	0.003	0.0	0.0
South Carolina	**141**	**0.139**	**47**	**0.202**	**21.3**	**40.4**	**51**	**0.115**	**27.5**	**33.3**	**43**	**0.115**	**4.7**	**27.9**
Yarn Manufacturing & Cotton Washing	98	0.106	26	0.130	15.4	15.4	43	0.125	30.2	30.2	29	0.069	0.0	0.0
Textile Mill Waste House	12	0.247	9	0.224	44.4	55.6	0	-	-	-	3	0.332	66.7	66.7
Textile Slashing and Weaving	20	0.403	12	0.489	16.7	83.3	0	-	-	-	8	0.302	0.0	87.5
Cotton Waste Proc/Recycl & Garnetting	8	0.472	0	-	-	-	5	0.521	20.0	80.0	3	0.401	0.0	100.0
Undetermined Process	3	0.003	0	-	-	-	3	0.003	0.0	0.0	0	-	-	-
Tennessee	**16**	**0.011**	**4**	**0.645**	**25.0**	**100.0**	**9**	**0.003**	**0.0**	**0.0**	**3**	**0.003**	**0.0**	**0.0**
Yarn Manufacturing & Cotton Washing	1	7.400	1	7.400	100.0	100.0	0	-	-	-	0	-	-	-
Cotton Waste Proc/Recycl & Garnetting	3	0.286	3	0.286	0.0	100.0	0	-	-	-	0	-	-	-
Undetermined Process	12	0.003	0	-	-	-	9	0.003	0.0	0.0	3	0.003	0.0	0.0

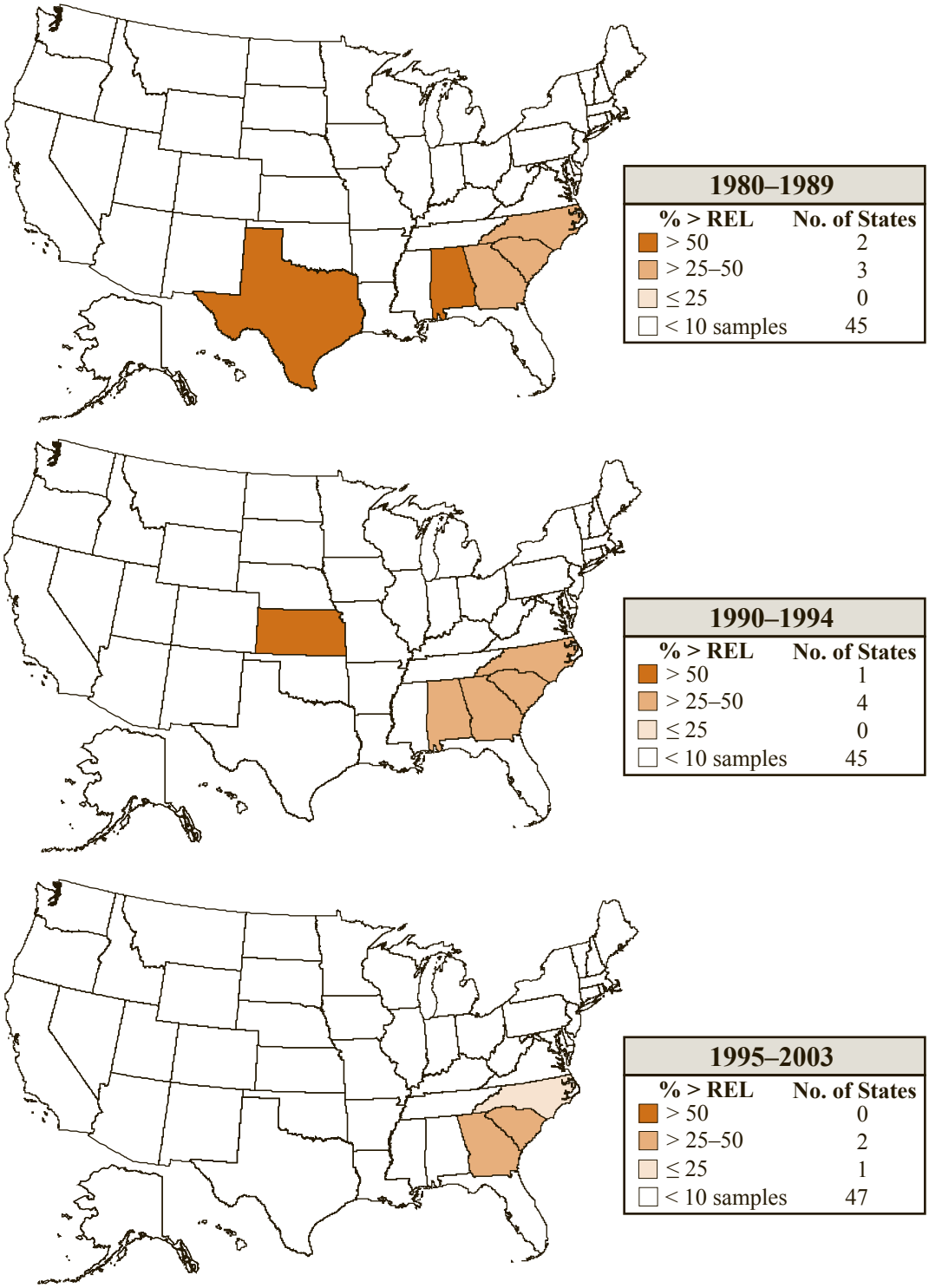
See footnotes at end of table.

Table 4-12 (page 3 of 3). Cotton dust: Geometric mean exposures and percent exceeding designated occupational exposure limits by OSHA region, state and process, OSHA samples, 1980–2003

	All years		1980–1989				1990–1994				1995–2003			
OSHA Region	No. of Samples	GM (mg/m³)	No. of Samples	GM (mg/m³)	% > PEL	% > REL	No. of Samples	GM (mg/m³)	% > PEL	% > REL	No. of Samples	GM (mg/m³)	% > PEL	% > REL
Region 5	**9**	**1.786**	**7**	**3.479**	**71.4**	**71.4**	**1**	**3.000**	**100.0**	**100.0**	**1**	**0.010**	**0.0**	**0.0**
Illinois	**8**	**1.674**	**7**	**3.479**	**71.4**	**71.4**	**0**	**-**	**-**	**-**	**1**	**0.010**	**0.0**	**0.0**
Yarn Manufacturing & Cotton Washing	2	0.200	2	0.200	0.0	0.0	0	-	-	-	0	-	-	-
Textile Mill Waste House	2	7.421	2	7.421	100.0	100.0	0	-	-	-	0	-	-	-
Cotton Waste Proc/Recycl & Garnetting	4	2.300	3	14.092	100.0	100.0	0	-	-	-	1	0.010	0.0	0.0
Michigan	**1**	**3.000**	**0**	**-**	**-**	**-**	**1**	**3.000**	**100.0**	**100.0**	**0**	**-**	**-**	**-**
Cotton Waste Proc/Recycl & Garnetting	1	3.000	0	-	-	-	1	3.000	100.0	100.0	0	-	-	-
Region 6	**77**	**0.281**	**75**	**0.283**	**54.7**	**62.7**	**2**	**0.212**	**0.0**	**50.0**	**0**	**-**	**-**	**-**
Texas	**77**	**0.281**	**75**	**0.283**	**54.7**	**62.7**	**2**	**0.212**	**0.0**	**50.0**	**0**	**-**	**-**	**-**
Yarn Manufacturing & Cotton Washing	62	0.278	62	0.278	61.3	61.3	0	-	-	-	0	-	-	-
Textile Mill Waste House	4	0.139	4	0.139	0.0	25.0	0	-	-	-	0	-	-	-
Textile Slashing and Weaving	1	0.410	1	0.410	0.0	100.0	0	-	-	-	0	-	-	-
Cotton Waste Proc/Recycl & Garnetting	10	0.380	8	0.439	37.5	87.5	2	0.212	0.0	50.0	0	-	-	-
Region 7	**19**	**0.493**	**1**	**0.740**	**0.0**	**100.0**	**18**	**0.482**	**66.7**	**88.9**	**0**	**-**	**-**	**-**
Kansas	**18**	**0.482**	**0**	**-**	**-**	**-**	**18**	**0.482**	**66.7**	**88.9**	**0**	**-**	**-**	**-**
Textile Mill Waste House	17	0.593	0	-	-	-	17	0.593	70.6	94.1	0	-	-	-
Undetermined Process	1	0.014	0	-	-	-	1	0.014	0.0	0.0	0	-	-	-
Missouri	**1**	**0.740**	**1**	**0.740**	**0.0**	**100.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Cotton Waste Proc/Recycl & Garnetting	1	0.740	1	0.740	0.0	100.0	0	-	-	-	0	-	-	-
Region 8	**4**	**0.714**	**4**	**0.714**	**0.0**	**100.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Colorado	**2**	**0.570**	**2**	**0.570**	**0.0**	**100.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Cotton Waste Proc/Recycl & Garnetting	2	0.570	2	0.570	0.0	100.0	0	-	-	-	0	-	-	-
Utah	**2**	**0.896**	**2**	**0.896**	**0.0**	**100.0**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
Cotton Waste Proc/Recycl & Garnetting	2	0.896	2	0.896	0.0	100.0	0	-	-	-	0	-	-	-
Region 9	**6**	**1.614**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**6**	**1.614**	**66.7**	**100.0**
California	**5**	**1.553**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**5**	**1.553**	**60.0**	**100.0**
Cotton Waste Proc/Recycl & Garnetting	5	1.553	0	-	-	-	0	-	-	-	5	1.553	60.0	100.0
Hawaii	**1**	**1.958**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**1**	**1.958**	**100.0**	**100.0**
Yarn Manufacturing & Cotton Washing	1	1.958	0	-	-	-	0	-	-	-	1	1.958	100.0	100.0
TOTAL	**1,092**	**0.150**	**571**	**0.180**	**33.8**	**42.4**	**391**	**0.133**	**24.0**	**32.5**	**130**	**0.097**	**11.5**	**26.9**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m³ - milligrams per cubic meter
OSHA - Occupational Safety and Health Administration
NOTE: The OSHA PEL is 0.2 mg/m³ for yarn manufacturing and cotton washing operations, 0.5 mg/m³ for textile mill waste house operations or for dust from lower grade washed cotton used during yarn manufacturing, 0.75 mg/m³ for textile slashing and weaving operations, and 1.0 mg/m³ for cotton waste processing operations or waste recycling (i.e., sorting, blending, cleaning, and willowing) and garnetting. The NIOSH REL is 0.2 mg/m³. See appendices for source description and methods.
SOURCE: OSHA Integrated Management Information System.

Figure 4-5. Cotton dust: Percent of exposures exceeding the NIOSH recommended exposure limit by state, OSHA samples, 1980–2003

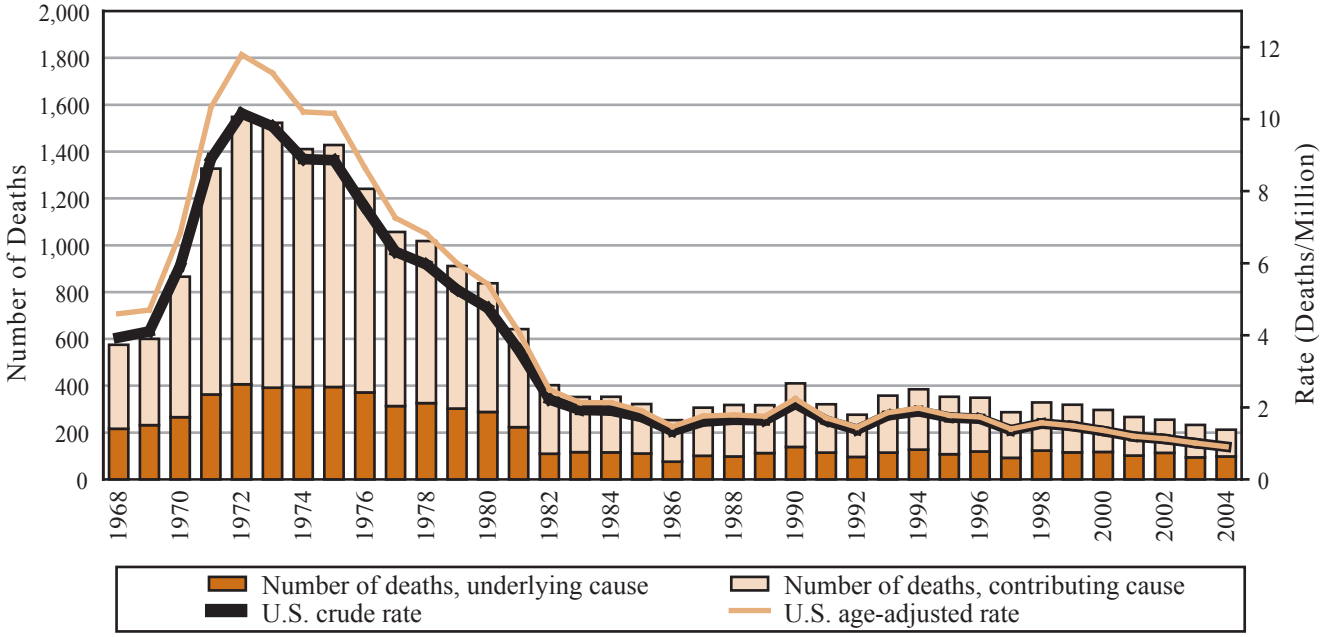


mg/m^3 - milligrams per cubic meter REL - recommended exposure limit OSHA - Occupational Safety and Health Administration
NOTE: The NIOSH REL is 0.2 mg/m^3. See appendices for source description, methods, and agents.
SOURCE: OSHA Integrated Management Information System.

Section 5

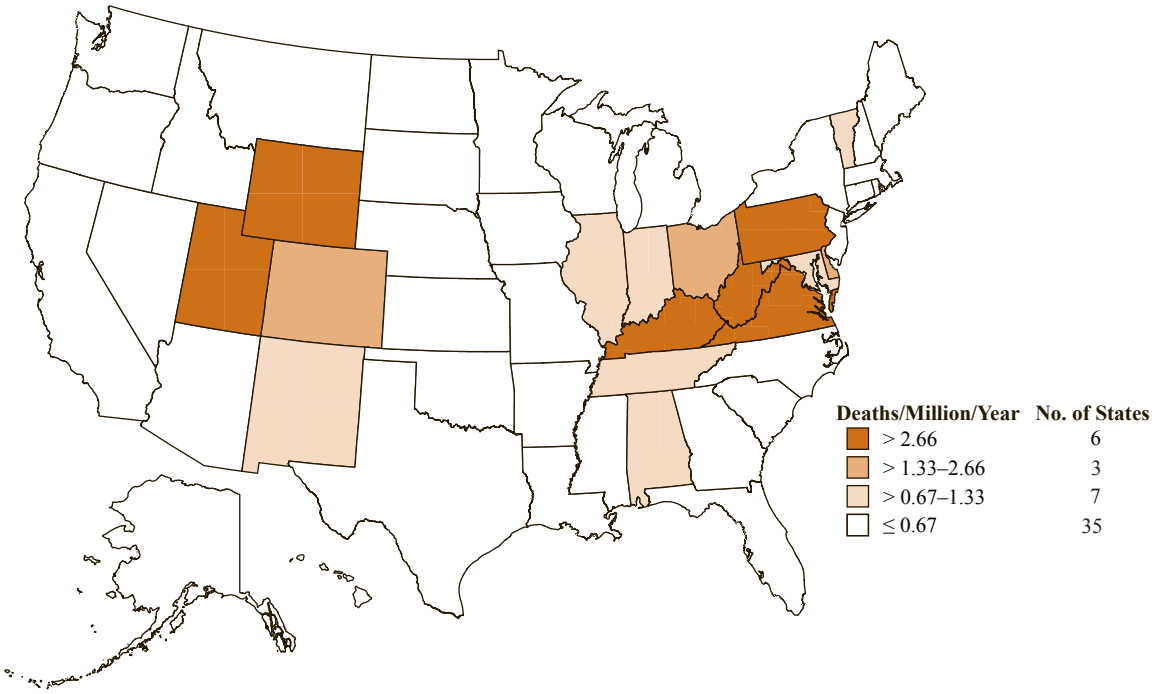
Unspecified and Other Pneumoconioses and Selected Agent Exposures

Figure 5-1. Unspecified and other pneumoconioses: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1968–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 5-2. Unspecified and other pneumoconioses: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 5-1. Unspecified and other pneumoconioses: Number of deaths by sex, race, and age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	353	30.6	344	9	339	13	1	-	-	-	10	27	86	158	72	78
1996	349	34.1	338	11	326	18	5	-	-	3	6	28	81	147	84	78
1997	287	32.1	277	10	270	16	1	-	-	1	3	18	57	130	78	80
1998	329	37.4	317	12	311	15	3	-	1	1	6	24	70	151	76	79
1999	318	36.2	311	7	300	16	2	-	-	2	4	19	70	138	85	79
2000	297	39.4	290	7	277	19	1	-	-	4	2	12	58	114	107	82
2001	267	38.2	256	11	250	17	-	-	-	1	9	6	58	101	92	81
2002	255	44.3	241	14	235	19	1	-	-	-	3	17	52	105	78	80
2003	233	40.3	225	8	226	4	3	-	-	2	4	18	38	100	71	80
2004	212	46.2	208	4	201	11	-	-	-	1	4	11	51	82	63	79
TOTAL	**2,900**	**37.3**	**2,807**	**93**	**2,735**	**148**	**17**	**-**	**1**	**15**	**51**	**180**	**621**	**1,226**	**806**	**79**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 5-2. Unspecified and other pneumoconioses: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1995	1.72	3.95	0.10	1.17	-	0.25	-
1996	1.68	3.72	0.12	1.58	-	1.16	-
1997	1.37	3.05	0.11	1.38	-	0.23	-
1998	1.55	3.51	0.10	1.19	0.07	0.22	0.39
1999	1.48	3.38	0.08	1.34	-	0.42	-
2000	1.34	3.02	0.06	1.45	0.07	0.18	-
2001	1.19	2.66	0.09	1.19	0.14	-	-
2002	1.12	2.41	0.15	1.47	-	0.17	-
2003	1.01	2.37	0.06	0.15	0.13	0.49	-
2004	0.91	2.10	0.04	0.82	-	-	-
1995–2004	**1.31**	**2.96**	**0.09**	**1.14**	**0.04**	**0.27**	**0.03**
			Age-Adjusted Death Rate				
1995	1.78	4.95	0.09	2.38	-	0.29	-
1996	1.73	4.70	0.11	3.09	-	2.13	-
1997	1.40	3.82	0.09	2.88	-	0.37	-
1998	1.57	4.22	0.09	2.31	0.09	0.62	0.50
1999	1.49	4.06	0.06	2.33	-	0.72	-
2000	1.36	3.83	0.05	3.13	0.07	0.43	-
2001	1.20	3.29	0.08	2.41	0.15	-	-
2002	1.13	2.90	0.12	2.95	-	0.38	-
2003	1.01	2.82	0.05	0.28	0.14	0.71	-
2004	0.91	2.46	0.04	1.74	-	-	-
1995–2004	**1.33**	**3.63**	**0.07**	**2.34**	**0.04**	**0.52**	**0.04**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 5-3. Unspecified and other pneumoconioses: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	240	20	10	-	15	-	285
1996	245	40	5	-	15	-	305
1997	135	15	10	-	-	-	160
1998	220	10	30	5	-	5	270
1999	155	-	45	-	5	-	205
2000	110	5	50	25	-	-	190
2001	140	15	15	20	-	-	190
2002	100	5	25	-	-	-	130
2003	130	-	-	50	20	-	200
2004	135	-	5	-	-	-	140
TOTAL	**1,610**	**110**	**195**	**100**	**55**	**5**	**2,075**
	Years of Potential Life Lost to Life Expectancy						
1995	3,132	127	106	-	29	-	3,394
1996	2,973	172	154	-	78	-	3,377
1997	2,327	117	137	-	14	-	2,595
1998	2,829	140	144	21	6	36	3,176
1999	2,683	59	189	-	30	-	2,961
2000	2,344	77	186	38	9	-	2,654
2001	2,165	118	145	51	-	-	2,479
2002	2,034	154	189	-	9	-	2,386
2003	2,081	69	20	77	62	-	2,309
2004	1,977	52	100	-	-	-	2,129
TOTAL	**24,545**	**1,085**	**1,370**	**187**	**237**	**36**	**27,460**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 5-4. Unspecified and other pneumoconioses: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	5	5	7	3	5	1	4	6	3	2	**41**
Alaska	-	-	-	-	-	-	1	-	-	-	**1**
Arizona	3	2	1	-	1	1	-	1	2	2	**13**
Arkansas	-	1	-	-	-	3	-	-	-	1	**5**
California	5	3	6	6	7	5	5	8	2	2	**49**
Colorado	5	7	4	6	3	2	5	4	3	4	**43**
Connecticut	-	1	1	2	-	2	-	1	-	-	**7**
Delaware	4	1	-	2	1	2	-	1	1	-	**12**
District of Columbia	-	1	-	-	-	-	-	-	-	-	**1**
Florida	9	12	7	11	1	3	6	1	3	3	**56**
Georgia	3	5	3	2	1	1	1	2	2	1	**21**
Hawaii	-	1	-	-	-	-	-	-	-	-	**1**
Idaho	-	1	-	-	-	-	-	1	-	-	**2**
Illinois	12	22	12	12	14	9	2	4	2	6	**95**
Indiana	5	6	7	-	8	3	2	4	1	1	**37**
Iowa	6	1	-	1	1	-	1	1	1	1	**13**
Kansas	1	1	-	-	-	-	1	1	1	-	**5**
Kentucky	29	14	24	26	38	23	27	22	16	21	**240**
Louisiana	-	1	-	2	-	1	2	1	1	-	**8**
Maine	-	2	-	-	-	-	-	-	-	-	**2**
Maryland	6	4	3	3	3	1	-	2	4	2	**28**
Massachusetts	2	4	-	2	1	1	4	2	1	2	**19**
Michigan	4	6	3	5	6	1	2	5	2	3	**37**
Minnesota	-	-	1	1	-	1	-	-	1	-	**4**
Mississippi	1	-	1	-	-	-	1	1	-	-	**4**
Missouri	3	-	2	2	1	1	2	-	-	-	**11**
Montana	-	-	-	1	-	-	-	-	1	-	**2**
Nebraska	-	-	-	-	-	-	-	-	-	-	**-**
Nevada	-	-	-	1	1	-	-	1	-	-	**3**
New Hampshire	1	-	-	-	1	1	-	-	1	-	**4**
New Jersey	10	3	3	4	2	6	2	2	1	1	**34**
New Mexico	2	1	4	2	-	3	-	1	3	-	**16**
New York	5	9	4	3	5	5	7	4	5	3	**50**
North Carolina	2	2	1	4	5	3	4	1	3	2	**27**
North Dakota	-	-	-	-	1	-	-	-	-	-	**1**
Ohio	17	25	11	30	28	11	15	19	11	11	**178**
Oklahoma	1	-	-	-	2	-	-	1	1	-	**5**
Oregon	1	-	-	1	-	1	-	1	-	-	**4**
Pennsylvania	101	104	92	73	75	85	75	56	68	60	**789**
Rhode Island	-	-	-	-	-	-	-	-	-	-	**-**
South Carolina	-	1	-	-	-	1	-	1	-	1	**4**
South Dakota	-	-	-	-	-	-	1	-	-	-	**1**
Tennessee	6	-	2	7	3	6	4	4	4	5	**41**
Texas	3	7	3	2	6	4	3	3	2	4	**37**
Utah	6	7	12	2	6	6	5	2	1	-	**47**
Vermont	1	1	2	1	1	-	-	-	-	-	**6**
Virginia	32	18	9	36	26	33	20	22	26	16	**238**
Washington	1	1	1	-	-	-	-	-	1	1	**5**
West Virginia	56	63	56	68	58	65	63	66	57	55	**607**
Wisconsin	1	1	1	2	1	3	-	1	-	1	**11**
Wyoming	4	5	4	6	6	3	2	2	2	1	**35**
TOTAL	**353**	**349**	**287**	**329**	**318**	**297**	**267**	**255**	**233**	**212**	**2,900**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 5-5. Unspecified and other pneumoconioses: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	41	12	1.16	11	1.18	12	393	17	9.6	40
Alaska	1	45	0.21	35	0.37	23	15	46	14.6	6
Arizona	13	24	0.33	24	0.31	27	154	23	11.9	22
Arkansas	5	32	0.24	31	0.22	36	75	32	15.0	5
California	49	9	0.19	38	0.22	36	598	7	12.2	17
Colorado	43	11	1.27	9	1.69	9	408	15	9.5	43
Connecticut	7	30	0.26	28	0.23	33	80	31	11.4	24
Delaware	12	26	1.91	8	2.02	7	115	27	9.6	40
District of Columbia	1	45	0.21	35	0.23	33	38	42	38.4	1
Florida	56	7	0.43	20	0.33	25	568	8	10.1	36
Georgia	21	21	0.33	24	0.42	22	300	20	14.3	9
Hawaii	1	45	0.10	48	0.10	48	14	48	14.1	11
Idaho	2	42	0.20	37	0.21	39	30	43	15.2	4
Illinois	95	6	0.98	13	1.01	13	937	6	9.9	38
Indiana	37	14	0.78	15	0.79	15	394	16	10.6	32
Iowa	13	24	0.55	17	0.44	20	115	27	8.8	46
Kansas	5	32	0.24	31	0.23	33	66	33	13.1	14
Kentucky	240	3	7.37	4	7.73	3	2,670	3	11.1	29
Louisiana	8	29	0.23	33	0.24	31	114	29	14.3	9
Maine	2	42	0.19	38	0.18	41	23	45	11.3	25
Maryland	28	19	0.67	16	0.74	16	342	18	12.2	17
Massachusetts	19	22	0.37	23	0.34	24	194	22	10.2	35
Michigan	37	14	0.47	19	0.49	17	416	14	11.2	27
Minnesota	4	36	0.10	48	0.10	48	49	38	12.2	17
Mississippi	4	36	0.18	42	0.19	40	51	36	12.7	15
Missouri	11	27	0.25	30	0.24	31	116	26	10.5	33
Montana	2	42	0.28	27	0.27	29	29	44	14.6	6
Nebraska	-	-	-	-	-	-	-	-	-	-
Nevada	3	41	0.19	38	0.22	36	66	33	21.8	2
New Hampshire	4	36	0.41	22	0.43	21	42	40	10.4	34
New Jersey	34	18	0.51	18	0.49	17	478	12	14.1	11
New Mexico	16	23	1.14	12	1.28	10	144	24	9.0	45
New York	50	8	0.33	24	0.33	25	564	9	11.3	25
North Carolina	27	20	0.42	21	0.45	19	338	19	12.5	16
North Dakota	1	45	0.19	38	0.17	43	9	49	8.5	47
Ohio	178	5	1.98	7	1.91	8	1,919	5	10.8	31
Oklahoma	5	32	0.18	42	0.18	41	39	41	7.7	49
Oregon	4	36	0.15	45	0.14	45	48	39	12.1	20
Pennsylvania	789	1	7.98	3	6.50	4	7,238	1	9.2	44
Rhode Island	-	-	-	-	-	-	-	-	-	-
South Carolina	4	36	0.12	46	0.13	46	84	30	21.1	3
South Dakota	1	45	0.17	44	0.16	44	15	46	14.6	6
Tennessee	41	12	0.90	14	0.94	14	498	11	12.1	20
Texas	37	14	0.23	33	0.28	28	523	10	14.1	11
Utah	47	10	2.84	6	4.01	6	465	13	9.9	38
Vermont	6	31	1.22	10	1.23	11	58	35	9.6	40
Virginia	238	4	4.22	5	4.87	5	2,658	4	11.2	27
Washington	5	32	0.11	47	0.12	47	50	37	10.1	36
West Virginia	607	2	40.99	1	35.80	1	6,740	2	11.1	29
Wisconsin	11	27	0.26	28	0.25	30	131	25	11.9	22
Wyoming	35	17	8.91	2	10.04	2	293	21	8.4	48

- indicates no deaths listed.

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 5-6. Unspecified and other pneumoconioses: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
041	Coal mining	833	57.9
060	Construction	90	6.3
270	Blast furnaces, steelworks, rolling and finishing mills	34	2.4
392	Not specified manufacturing industries	30	2.1
351	Motor vehicles and motor vehicle equipment	19	1.3
040	Metal mining	18	1.3
400	Railroads	17	1.2
842	Elementary and secondary schools	17	1.2
010	Agricultural production, crops	16	1.1
961	Non-paid worker or non-worker or own home/at home	15	1.0
	All other industries	316	21.9
	Industry not reported	35	2.4
	TOTAL	**1,440**	**100.0**

CIC - Census Industry Code
NOTE: The comparable number of unspecified and other pneumoconioses deaths in the entire United States for this same time period was 3,384. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 5-7. Unspecified and other pneumoconioses: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
616	Mining machine operators	758	52.6
889	Laborers, except construction	68	4.7
453	Janitors and cleaners	32	2.2
019	Managers and administrators, n.e.c.	27	1.9
575	Electricians	25	1.7
783	Welders and cutters	24	1.7
804	Truck drivers	23	1.6
869	Construction laborers	22	1.5
633	Supervisors, production occupations	21	1.5
473	Farmers, except horticulture	18	1.3
	All other occupations	391	27.2
	Occupation not reported	31	2.2
	TOTAL	**1,440**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of unspecified and other pneumoconioses deaths in the entire United States for this same time period was 3,384. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 5-8. Unspecified and other pneumoconioses: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
041	Coal mining	833	41.6	38.9	44.6
040	Metal mining	18	4.9	2.9	7.8
252	Structural clay products	7	4.5	1.8	9.2
262	Miscellaneous nonmetallic mineral and stone products	7	3.0	1.2	6.3
271	Iron and steel foundries	10	2.8	1.3	5.1
050	Nonmetallic mining and quarrying, except fuel	7	2.5	1.0	5.2

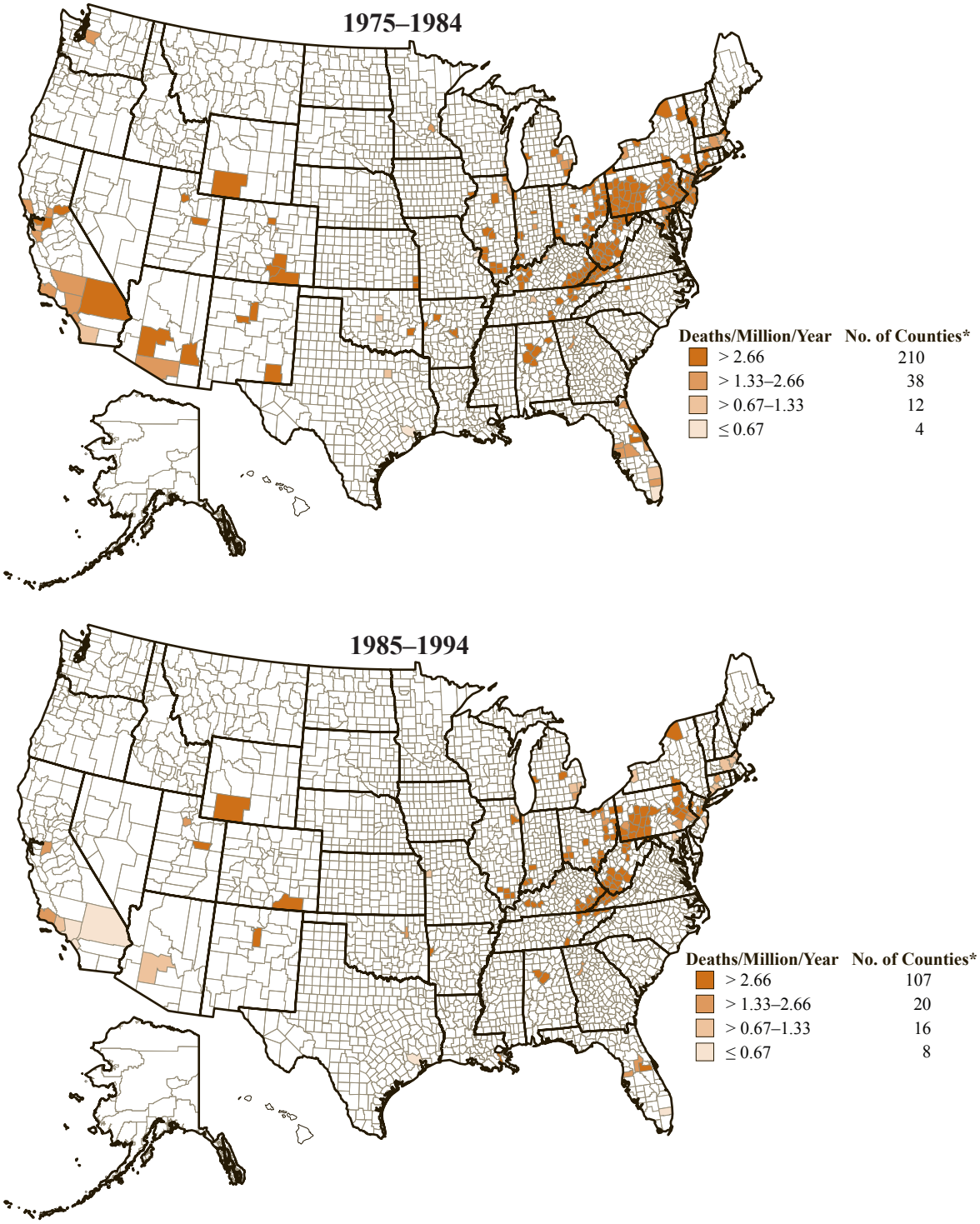
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with unspecified and other pneumoconioses reported was 1,440 in these same selected states and years, and the comparable number of unspecified and other pneumoconioses deaths in the entire United States for this same time period was 3,384. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 5-9. Unspecified and other pneumoconioses: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
616	Mining machine operators	758	40.3	37.5	43.3
613	Supervisors, extractive occupations	17	17.4	10.1	27.8
768	Crushing and grinding machine operators	7	8.5	3.4	17.5
783	Welders and cutters	24	1.9	1.2	2.8
575	Electricians	25	1.6	1.1	2.4

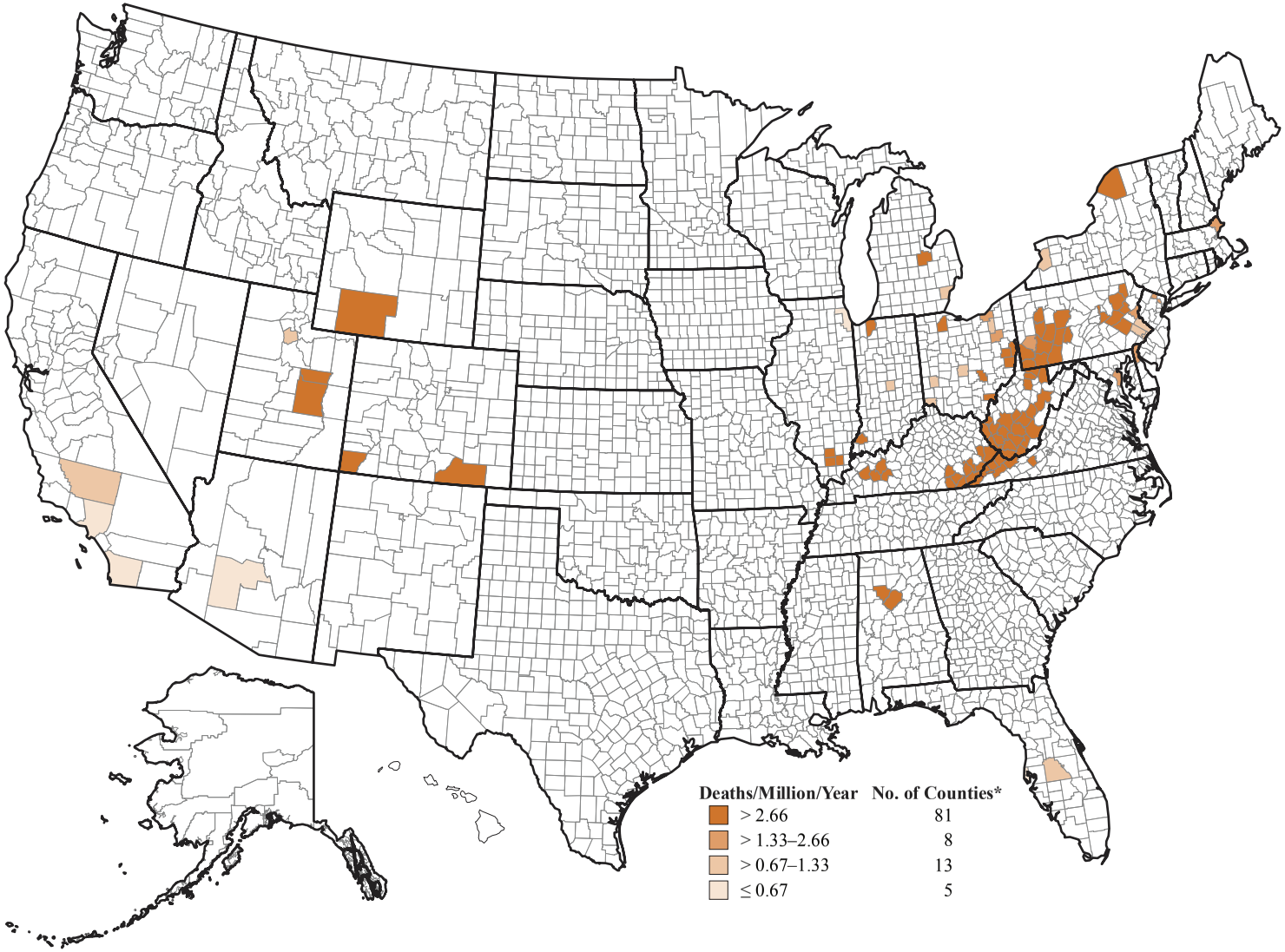
COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with unspecified and other pneumoconioses reported was 1,440 in these same selected states and years, and the comparable number of unspecified and other pneumoconioses deaths in the entire United States for this same time period was 3,384. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 5-3a. Unspecified and other pneumoconioses: Age-adjusted death rates by county, U.S. residents age 15 and over, 1975–1984 and 1985–1994



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 5-3b. Unspecified and other pneumoconioses: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 5-10. Unspecified and other pneumoconioses: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 1995–2004

County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Dickenson County	Virginia	227.9	229.8	31	0.0
Sweetwater County	Wyoming	183.3	113.5	33	0.0
Carbon County	Utah	180.1	196.7	31	0.0
Logan County	West Virginia	178.6	187.3	58	0.0
Norton City	Virginia	163.9	188.0	6	0.0
Wyoming County	West Virginia	159.7	161.4	34	0.0
Boone County	West Virginia	149.6	149.6	31	0.0
McDowell County	West Virginia	141.9	171.4	38	0.0
Clay County	West Virginia	138.2	134.0	11	9.1
Wise County	Virginia	136.7	135.2	47	0.0
Tazewell County	Virginia	128.4	144.3	53	0.0
Nicholas County	West Virginia	127.5	143.4	31	0.0
Raleigh County	West Virginia	127.4	145.5	95	0.0
Mingo County	West Virginia	125.6	114.9	26	3.8
Russell County	Virginia	114.1	116.0	28	0.0
Fayette County	West Virginia	112.5	137.7	54	0.0
Leslie County	Kentucky	104.3	89.6	9	0.0
Muhlenberg County	Kentucky	104.1	122.2	32	0.0
Harlan County	Kentucky	97.7	105.2	28	0.0
Emery County	Utah	91.9	76.2	6	0.0
Buchanan County	Virginia	91.7	80.5	18	0.0
Cambria County	Pennsylvania	89.6	135.9	172	0.6
Floyd County	Kentucky	87.0	77.8	27	0.0
Las Animas County	Colorado	81.9	131.1	16	0.0
Mercer County	West Virginia	80.8	103.5	54	1.9
Webster County	West Virginia	66.5	75.8	6	0.0
Franklin County	Illinois	65.2	100.9	32	0.0
Bell County	Kentucky	57.9	61.7	15	0.0
Perry County	Kentucky	51.8	46.2	11	0.0
Lincoln County	West Virginia	49.9	44.6	8	0.0
Butler County	Kentucky	47.9	47.7	5	0.0
Letcher County	Kentucky	44.9	43.5	9	0.0
Somerset County	Pennsylvania	43.4	60.8	40	0.0
Knox County	Kentucky	42.3	43.6	11	0.0
Indiana County	Pennsylvania	40.5	46.9	35	0.0
Lee County	Virginia	40.0	47.0	9	0.0
Saline County	Illinois	39.1	59.8	13	0.0
Fayette County	Pennsylvania	36.9	52.1	63	0.0
Clarion County	Pennsylvania	36.4	40.7	14	0.0
Marion County	West Virginia	35.5	48.9	23	4.3
Pike County	Kentucky	34.0	32.2	18	0.0
Laurel County	Kentucky	33.0	26.0	11	0.0
Clearfield County	Pennsylvania	32.8	42.6	29	0.0
Summers County	West Virginia	32.3	46.1	5	0.0
Whitley County	Kentucky	32.0	31.4	9	0.0
Wayne County	West Virginia	29.4	28.7	10	0.0
Meigs County	Ohio	29.2	32.3	6	0.0
Harrison County	Ohio	27.9	38.8	5	0.0
Schuylkill County	Pennsylvania	27.6	42.4	53	0.0
Greene County	Pennsylvania	27.0	32.9	11	0.0
Overall United States		**1.3**	**1.3**	**2,900**	**3.2**

NOTE: Only counties with at least 5 deaths from the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 5-11 (1 of 4). Selected pneumoconiotic agents: Geometric mean exposures and percent exceeding designated occupational exposure limits, MSHA and OSHA samples, 1979–2003

	Aluminum Oxide Fume and Dust MSHA				Aluminum Oxide and Alpha Aluminum OSHA				Antimony and Compounds OSHA				Beryllium Fume and Dust MSHA			
Year	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM ($\mu g/m^3$)	No. of Samples	% > PEL	% > REL
1979	0.117	145	0.0	-	0.209	22	18.2	-	0.015	60	6.7	6.7	0.334	65	13.8	-
1980	0.025	152	0.0	-	1.155	15	0.0	-	0.011	146	1.4	1.4	0.164	53	0.0	-
1981	0.017	170	0.6	-	0.196	6	0.0	-	0.020	96	7.3	7.3	0.176	83	1.2	-
1982	0.010	85	1.2	-	1.184	26	19.2	-	0.012	61	4.9	4.9	0.183	72	4.2	-
1983	0.017	148	0.0	-	0.642	9	22.2	-	0.009	94	0.0	0.0	0.189	171	2.9	-
1984	0.018	160	0.0	-	0.043	21	0.0	-	0.012	87	6.9	6.9	0.161	155	0.0	-
1985	0.020	177	0.0	-	0.024	37	8.1	-	0.007	173	1.2	1.2	0.164	168	0.0	-
1986	0.019	121	0.0	-	0.029	17	5.9	-	0.009	73	2.7	2.7	0.215	81	1.2	-
1987	0.031	139	0.7	-	0.007	28	0.0	-	0.006	129	2.3	2.3	0.172	81	0.0	-
1988	0.033	112	1.8	-	0.041	30	3.3	-	0.004	78	1.3	1.3	0.189	97	0.0	-
1989	0.025	133	0.0	-	0.050	20	5.0	-	0.007	101	5.9	5.9	0.166	75	1.3	-
1990	0.030	182	1.6	-	0.013	21	0.0	-	0.007	90	3.3	3.3	0.160	64	0.0	-
1991	0.022	143	0.7	-	0.014	33	0.0	-	0.005	120	1.7	1.7	0.169	48	0.0	-
1992	0.029	120	1.7	-	0.004	11	0.0	-	0.004	74	0.0	0.0	0.159	39	0.0	-
1993	0.009	140	0.0	-	0.019	29	3.4	-	0.005	61	0.0	0.0	0.150	107	0.0	-
1994	0.012	241	0.0	-	0.021	26	0.0	-	0.002	135	0.7	0.7	0.152	217	0.0	-
1995	0.011	206	0.0	-	0.057	38	5.3	-	0.004	116	1.7	1.7	0.152	183	0.0	-
1996	0.006	765	0.0	-	0.040	14	7.1	-	0.005	102	2.9	2.9	0.153	582	0.2	-
1997	0.008	227	0.0	-	0.004	18	0.0	-	0.004	80	1.3	1.3	0.162	113	0.0	-
1998	0.005	67	0.0	-	0.020	41	0.0	-	0.009	33	9.1	9.1	0.166	43	0.0	-
1999	0.002	101	0.0	-	0.010	28	0.0	-	0.010	104	1.9	1.9	0.169	88	0.0	-
2000	0.004	97	0.0	-	-	0	-	-	-	0	-	-	0.168	91	0.0	-
2001	0.003	113	0.0	-	-	0	-	-	-	0	-	-	0.150	113	0.0	-
2002	0.003	64	0.0	-	-	0	-	-	-	0	-	-	0.150	64	0.0	-
2003	0.003	88	0.0	-	-	0	-	-	-	0	-	-	0.150	96	0.0	-

See footnotes at end of table.

Table 5-11 (2 of 4). Selected pneumoconiotic agents: Geometric mean exposures and percent exceeding designated occupational exposure limits, MSHA and OSHA samples, 1979–2003

	Beryllium and Compounds OSHA				Carbon Black OSHA				Cobalt Fume and Dust MSHA				Cobalt, Metal, Fume and Dust OSHA			
Year	GM ($\mu g/m^3$)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM ($\mu g/m^3$)	No. of Samples	% > PEL	% > REL	GM ($\mu g/m^3$)	No. of Samples	% > PEL	% > REL
1979	0.045	29	6.9	-	0.460	16	0.0	0.0	4,001.200	2	100.0	100.0	3.728	46	2.2	4.3
1980	0.102	58	8.6	-	1.531	30	20.0	20.0	26.026	3	33.3	33.3	8.042	66	4.5	13.6
1981	0.046	60	5.0	-	1.376	30	16.7	16.7	1.442	4	0.0	0.0	7.962	85	7.1	12.9
1982	0.042	51	2.0	-	1.008	29	10.3	10.3	-	0	-	-	9.170	162	11.7	21.6
1983	0.069	55	5.5	-	1.141	29	10.3	10.3	0.485	111	0.9	1.8	5.981	163	6.1	10.4
1984	0.032	676	1.5	-	1.093	27	22.2	22.2	0.313	124	0.0	0.0	5.579	174	7.5	12.6
1985	0.037	701	3.1	-	1.946	31	25.8	25.8	0.382	123	0.0	0.8	8.401	165	10.3	18.2
1986	0.027	574	0.2	-	0.898	34	11.8	11.8	0.426	55	0.0	0.0	5.997	225	9.3	13.3
1987	0.031	778	1.2	-	0.713	26	15.4	15.4	0.410	89	0.0	0.0	3.024	248	7.3	12.5
1988	0.035	803	1.2	-	0.780	41	4.9	4.9	0.390	60	0.0	0.0	3.350	327	5.2	8.0
1989	0.033	380	1.1	-	0.432	35	5.7	5.7	0.366	102	0.0	0.0	3.111	416	3.4	3.4
1990	0.033	795	1.8	-	0.917	40	15.0	15.0	0.376	105	0.0	1.0	6.291	212	14.6	14.6
1991	0.031	603	0.3	-	0.896	24	25.0	25.0	0.367	72	0.0	1.4	6.774	289	15.2	15.2
1992	0.029	642	0.6	-	0.509	39	7.7	7.7	0.393	41	0.0	0.0	3.556	242	10.3	10.3
1993	0.034	561	1.4	-	0.499	41	4.9	4.9	0.286	105	0.0	0.0	3.576	117	6.8	11.1
1994	0.029	404	0.5	-	0.904	34	8.8	8.8	0.329	212	0.9	1.9	1.719	185	2.7	5.9
1995	0.027	373	0.0	-	0.899	39	10.3	10.3	0.306	187	0.0	0.0	0.871	366	3.6	5.5
1996	0.029	301	0.7	-	0.592	18	16.7	16.7	0.270	580	0.2	0.2	0.330	726	1.8	2.2
1997	0.030	429	0.7	-	0.633	33	15.2	15.2	0.309	102	0.0	1.0	0.388	633	1.3	2.4
1998	0.028	350	0.9	-	0.663	28	7.1	7.1	0.287	44	0.0	0.0	0.409	478	2.3	2.5
1999	0.035	322	1.6	-	0.337	28	0.0	0.0	0.308	90	0.0	0.0	0.433	302	0.0	0.3
2000	-	0	-	-	-	0	-	-	0.300	91	0.0	0.0	-	0	-	-
2001	-	0	-	-	-	0	-	-	0.271	114	0.0	0.9	-	0	-	-
2002	-	0	-	-	-	0	-	-	0.270	64	0.0	0.0	-	0	-	-
2003	-	0	-	-	-	0	-	-	0.271	96	0.0	0.0	-	0	-	-

See footnotes at end of table.

Table 5-11 (3 of 4). Selected pneumoconiotic agents: Geometric mean exposures and percent exceeding designated occupational exposure limits, MSHA and OSHA samples, 1979–2003

	Iron Oxide Fume MSHA				Iron Oxide Fume OSHA				Talc, Nonfibrous, < 1% quartz MSHA				Tin, inorganic compounds except oxide, as Sn OSHA			
Year	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mppcf)	No. of Samples	% > PEL	% > REL	GM ($\mu g/m^3$)	No. of Samples	% > PEL	% > REL
1979	0.432	155	1.9	3.2	1.362	597	6.0	18.1	7.980	56	14.3	-	6.975	124	1.6	1.6
1980	0.485	155	0.6	5.2	1.087	873	5.5	16.4	5.391	35	8.6	-	5.065	124	0.8	0.8
1981	0.336	226	0.9	2.2	0.948	1,166	5.1	16.5	3.932	61	4.9	-	6.743	57	1.8	1.8
1982	0.398	119	2.5	4.2	0.893	1,222	5.4	13.9	5.969	33	6.1	-	5.644	39	0.0	0.0
1983	0.212	152	1.3	4.6	0.472	1,232	3.4	9.8	1.702	68	7.4	-	8.946	26	0.0	0.0
1984	0.283	182	1.6	3.3	0.753	859	4.5	14.4	2.086	22	9.1	-	7.921	113	0.0	0.0
1985	0.303	211	0.5	4.7	0.501	995	4.2	12.5	2.874	14	7.1	-	6.142	173	1.7	1.7
1986	0.241	171	0.6	2.3	0.484	935	1.9	9.0	4.738	29	3.4	-	6.851	119	0.0	0.0
1987	0.215	181	1.1	5.0	0.406	863	2.3	8.1	5.412	18	11.1	-	5.961	218	0.0	0.0
1988	0.329	136	0.7	3.7	0.333	963	3.0	8.9	4.899	30	6.7	-	6.023	158	0.6	0.6
1989	0.285	163	2.5	5.5	0.583	1,117	4.3	13.1	5.651	24	8.3	-	6.532	165	0.0	0.0
1990	0.200	213	2.3	5.2	0.435	1,045	3.7	11.2	8.108	9	33.3	-	6.490	293	0.3	0.3
1991	0.200	177	1.1	3.4	0.293	957	1.3	4.3	3.414	6	0.0	-	7.124	261	0.0	0.0
1992	0.199	136	1.5	5.9	0.315	894	1.3	4.7	2.551	13	0.0	-	5.711	162	0.0	0.0
1993	0.097	136	1.5	4.4	0.349	912	1.5	5.2	6.497	11	18.2	-	6.105	130	0.0	0.0
1994	0.109	200	3.0	4.0	0.392	853	2.8	7.3	-	0	-	-	4.852	200	0.0	0.0
1995	0.111	173	0.0	2.9	0.294	854	2.2	6.3	-	0	-	-	6.214	184	0.5	0.5
1996	0.062	381	1.1	3.4	0.311	755	4.8	7.9	26.049	5	40.0	-	4.455	174	0.0	0.0
1997	0.058	154	0.0	1.9	0.308	782	2.2	5.4	3.000	1	0.0	-	5.244	94	0.0	0.0
1998	0.127	58	0.0	0.0	0.346	513	2.1	8.6	-	0	-	-	5.539	84	0.0	0.0
1999	0.027	40	0.0	0.0	0.316	469	1.7	6.0	-	0	-	-	7.079	46	2.2	2.2
2000	0.233	55	0.0	0.0	-	0	-	-	-	0	-	-	-	0	-	-
2001	0.174	79	0.0	1.3	-	0	-	-	-	0	-	-	-	0	-	-
2002	0.119	44	0.0	0.0	-	0	-	-	-	0	-	-	-	0	-	-
2003	0.074	69	0.0	1.4	-	0	-	-	-	0	-	-	-	0	-	-

See footnotes at end of table.

Table 5-11 (4 of 4). Selected pneumoconiotic agents: Geometric mean exposures and percent exceeding designated occupational exposure limits, MSHA and OSHA samples, 1979–2003

	Titanium Dioxide Fume and Dust MSHA				Welding Fumes (total particulate) MSHA				Welding Fumes (total particulate) OSHA			
Year	GM ($\mu g/m^3$)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL	GM (mg/m^3)	No. of Samples	% > PEL	% > REL
1979	21.708	111	0.0	-	2.389	165	13.3	-	7.047	7	-	-
1980	4.127	56	0.0	-	1.591	175	9.1	-	3.183	33	-	-
1981	6.503	116	0.0	-	1.076	212	4.7	-	3.063	24	-	-
1982	2.577	97	0.0	-	0.932	117	2.6	-	2.232	119	-	-
1983	3.699	124	0.0	-	0.908	94	3.2	-	2.845	40	-	-
1984	2.432	129	0.0	-	0.932	47	4.3	-	4.116	27	-	-
1985	3.450	145	0.0	-	1.569	79	11.4	-	2.982	33	-	-
1986	3.224	100	0.0	-	1.344	45	0.0	-	0.924	12	-	-
1987	4.961	123	0.0	-	1.985	31	16.1	-	2.213	51	-	-
1988	7.271	104	0.0	-	1.775	44	6.8	-	2.359	25	-	-
1989	7.322	106	0.9	-	1.530	20	0.0	-	3.557	77	48.2	-
1990	4.236	145	0.0	-	0.169	5	0.0	-	1.806	247	27.5	-
1991	6.514	108	0.0	-	1.948	2	0.0	-	1.356	333	20.7	-
1992	3.787	55	0.0	-	0.070	1	0.0	-	1.650	344	18.3	-
1993	1.298	119	0.0	-	1.000	1	0.0	-	1.385	275	22.1	-
1994	1.375	215	0.0	-	-	0	-	-	1.508	181	-	-
1995	1.064	188	0.0	-	-	0	-	-	0.946	136	-	-
1996	0.677	578	0.0	-	-	0	-	-	0.865	197	-	-
1997	0.824	128	0.0	-	-	0	-	-	0.770	153	-	-
1998	1.488	48	0.0	-	-	0	-	-	0.999	208	-	-
1999	0.488	86	0.0	-	-	0	-	-	0.874	180	-	-
2000	0.755	95	0.0	-	-	0	-	-	-	0	-	-
2001	0.663	113	0.0	-	-	0	-	-	-	0	-	-
2002	0.949	64	0.0	-	-	0	-	-	-	0	-	-
2003	0.674	88	0.0	-	-	0	-	-	-	0	-	-

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m^3 - milligrams per cubic meter
$\mu g/m^3$ - micrograms per cubic meter mppcf - millions of particles per cubic foot MSHA - Mine Safety and Health Administration
OSHA - Occupational Safety and Health Administration

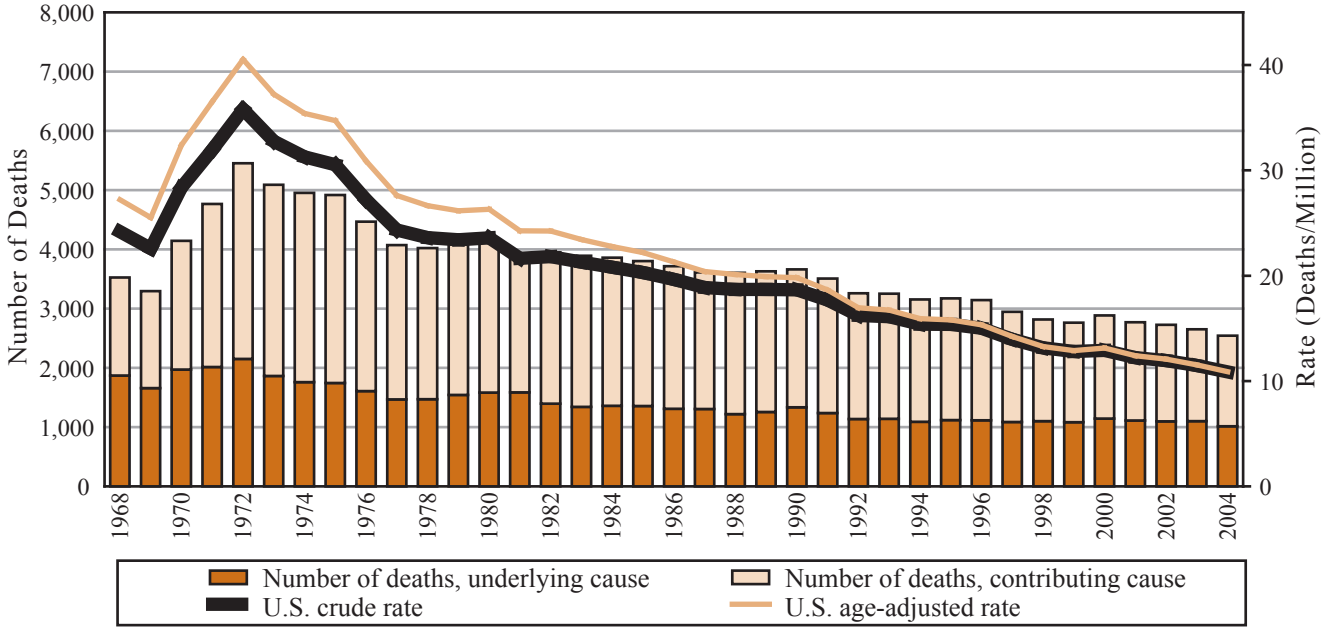
NOTE: Pneumoconiotic agents with at least 300 total samples in MSHA or OSHA for the time period 1979-2003 are presented. From March 1, 1989 to March 22, 1993, the OSHA PELs in force differed from those employed before and after those dates. NIOSH has designated beryllium and titanium dioxide as potential occupational carcinogens, and recommends reducing exposures to as low as feasible. The % > REL cannot be calculated for talc because the REL is in units of mg/m^3, but MSHA samples and analyzes for talc using units of millions of particles per cubic foot (mppcf). For welding fumes - OSHA, the % > PEL is based on fewer samples than the number reported for the years 1989 and 1993 because OSHA adopted a PEL for welding fumes that was enforced from March 1, 1989 through March 22, 1993. Samples collected in 1989 before March 1, or in 1993 after March 23 are not compared to a PEL. See appendices for source description, methods, and agents.

SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.

Section 6

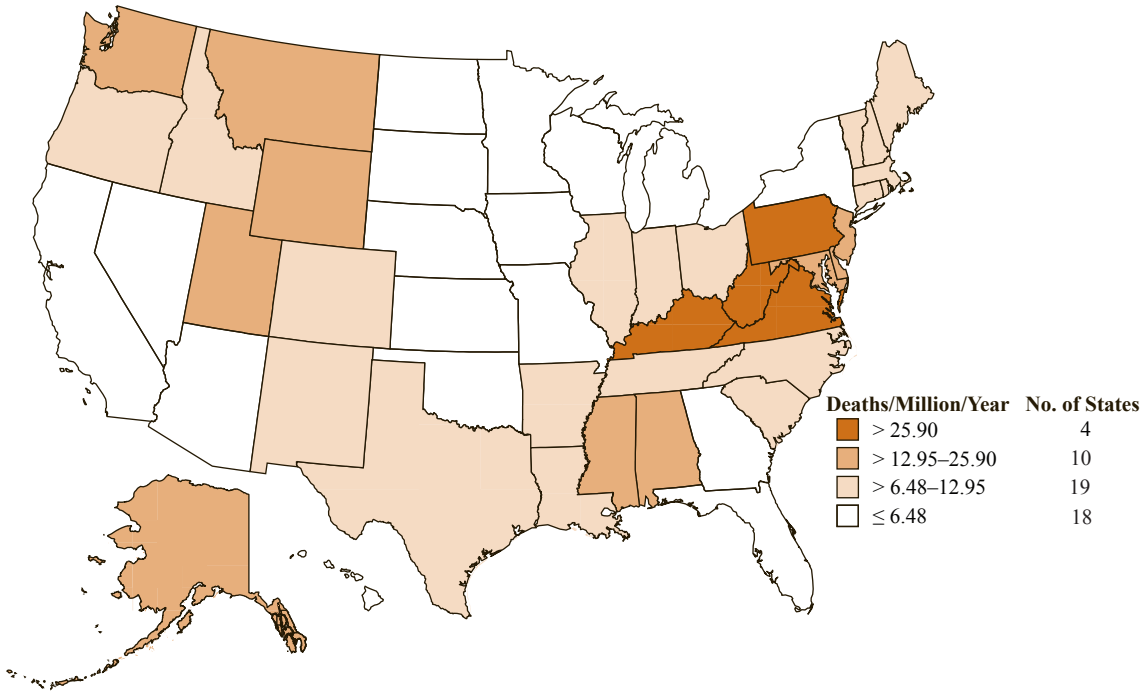
All Pneumoconioses and Related Exposures

Figure 6-1. All pneumoconioses: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1968–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 6-2. All pneumoconioses: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 6-1. All pneumoconioses: Number of deaths by sex, race, and age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	3,151	35.4	3,092	59	2,983	160	8	-	4	10	68	245	913	1,337	574	77
1996	3,115	35.8	3,031	84	2,937	164	14	-	1	11	51	210	883	1,364	595	78
1997	2,928	37.1	2,851	77	2,780	139	9	-	2	12	48	191	751	1,313	611	78
1998	2,791	39.4	2,720	71	2,651	127	13	-	3	11	41	189	733	1,226	588	78
1999	2,745	39.5	2,683	62	2,592	136	17	-	1	9	38	177	683	1,210	627	78
2000	2,864	39.9	2,783	81	2,704	144	16	2	4	14	42	170	651	1,236	745	79
2001	2,747	40.4	2,674	73	2,585	148	14	2	-	11	47	194	632	1,195	666	78
2002	2,718	40.3	2,631	87	2,570	137	11	1	3	10	41	186	599	1,213	665	79
2003	2,639	41.8	2,546	93	2,488	134	17	2	4	15	46	184	544	1,180	664	79
2004	2,531	40.1	2,454	77	2,372	149	10	-	4	14	49	175	501	1,110	678	80
TOTAL	**28,229**	**38.9**	**27,465**	**764**	**26,662**	**1,438**	**129**	**7**	**26**	**117**	**471**	**1,921**	**6,890**	**12,384**	**6,413**	**78**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-2. All pneumoconioses: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1995	15.37	35.03	0.64	14.17	0.15	1.96	-
1996	15.01	33.76	0.91	14.26	0.15	3.02	0.21
1997	13.96	31.74	0.78	11.41	0.52	2.04	-
1998	13.15	30.13	0.68	10.36	0.37	1.96	0.79
1999	12.81	29.21	0.65	11.19	0.14	3.61	-
2000	12.90	29.30	0.83	11.34	0.21	2.89	-
2001	12.22	27.73	0.73	11.38	0.27	2.44	-
2002	11.94	27.12	0.85	10.24	0.34	1.68	0.16
2003	11.47	25.92	0.89	9.69	0.47	2.75	-
2004	10.87	24.54	0.75	10.94	0.20	1.41	0.15
1995–2004	**12.72**	**28.94**	**0.76**	**11.25**	**0.28**	**2.20**	**0.12**
			Age-Adjusted Death Rate				
1995	15.80	42.82	0.53	27.72	0.21	3.67	-
1996	15.33	41.15	0.75	26.01	0.18	6.32	0.42
1997	14.22	38.57	0.64	21.18	0.70	3.82	-
1998	13.27	35.68	0.55	19.28	0.43	3.81	1.25
1999	12.88	34.41	0.52	20.91	0.16	6.27	-
2000	13.14	35.77	0.68	22.43	0.24	6.18	-
2001	12.40	33.09	0.59	22.27	0.30	5.34	-
2002	12.07	32.04	0.70	20.36	0.41	3.60	0.17
2003	11.53	30.38	0.73	18.38	0.55	5.03	-
2004	10.88	28.54	0.59	21.15	0.20	2.48	0.25
1995–2004	**12.95**	**34.80**	**0.62**	**22.05**	**0.34**	**4.50**	**0.20**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 6-3. All pneumoconioses: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	2,365	40	165	15	50	-	2,635
1996	1,815	115	140	-	55	-	2,125
1997	1,810	105	130	-	-	-	2,045
1998	1,665	60	170	30	10	5	1,940
1999	1,340	60	260	25	30	-	1,715
2000	1,745	80	185	25	25	-	2,060
2001	1,610	145	220	35	30	-	2,040
2002	1,535	240	150	10	5	5	1,945
2003	1,735	195	175	55	55	-	2,215
2004	1,790	45	210	25	30	-	2,100
TOTAL	**17,410**	**1,085**	**1,805**	**220**	**290**	**10**	**20,820**
	Years of Potential Life Lost to Life Expectancy						
1995	28,815	684	1,440	37	152	-	31,128
1996	27,385	1,004	1,566	28	195	8	30,186
1997	25,884	865	1,305	63	111	-	28,228
1998	24,977	746	1,213	95	112	51	27,194
1999	23,921	673	1,397	51	243	-	26,285
2000	24,784	960	1,405	58	198	-	27,405
2001	24,408	899	1,481	87	181	-	27,056
2002	24,048	1,155	1,294	66	105	22	26,690
2003	23,838	1,171	1,373	142	254	-	26,778
2004	23,127	813	1,582	75	146	7	25,750
TOTAL	**251,187**	**8,970**	**14,056**	**702**	**1,697**	**88**	**276,700**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-4. All pneumoconioses: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	57	65	65	62	61	69	68	67	84	73	**671**
Alaska	-	3	2	5	3	4	2	4	3	2	**28**
Arizona	28	25	21	16	29	25	23	16	21	17	**221**
Arkansas	15	14	12	10	16	25	16	14	17	23	**162**
California	145	127	119	117	128	143	131	132	139	127	**1,308**
Colorado	30	37	30	26	27	27	31	31	27	35	**301**
Connecticut	16	22	15	19	17	24	23	20	24	21	**201**
Delaware	15	12	10	15	23	18	13	17	15	12	**150**
District of Columbia	2	2	1	-	-	-	3	1	1	-	**10**
Florida	102	128	95	92	116	104	103	112	106	112	**1,070**
Georgia	26	22	23	22	22	34	29	27	28	20	**253**
Hawaii	5	2	1	1	1	3	5	6	5	1	**30**
Idaho	6	9	8	6	8	9	9	5	9	12	**81**
Illinois	72	85	78	68	64	71	56	40	42	43	**619**
Indiana	31	30	40	38	32	31	28	26	32	20	**308**
Iowa	18	12	11	16	11	14	15	12	8	11	**128**
Kansas	19	11	8	7	6	8	12	9	4	12	**96**
Kentucky	122	154	139	129	134	109	112	109	116	113	**1,237**
Louisiana	21	25	25	31	25	43	39	46	46	31	**332**
Maine	8	9	8	16	16	16	12	18	12	19	**134**
Maryland	68	65	53	60	60	46	47	60	48	61	**568**
Massachusetts	44	45	48	46	39	43	40	37	36	44	**422**
Michigan	47	49	41	37	47	43	47	47	49	47	**454**
Minnesota	24	13	19	19	24	19	28	23	23	33	**225**
Mississippi	42	35	41	32	35	48	53	61	53	62	**462**
Missouri	23	15	20	20	20	25	23	21	13	18	**198**
Montana	5	8	5	8	4	10	8	15	20	18	**101**
Nebraska	4	3	6	2	7	5	8	5	4	6	**50**
Nevada	7	6	4	8	9	6	6	10	5	7	**68**
New Hampshire	7	4	10	6	7	6	6	6	7	7	**66**
New Jersey	112	121	89	104	102	98	103	89	83	76	**977**
New Mexico	19	11	15	10	10	16	12	11	13	8	**125**
New York	56	64	59	57	72	77	81	82	82	81	**711**
North Carolina	65	54	49	67	54	63	69	47	62	67	**597**
North Dakota	-	4	4	2	5	2	4	4	5	2	**32**
Ohio	140	141	104	128	122	111	114	125	109	88	**1,182**
Oklahoma	10	6	14	11	15	15	7	12	13	13	**116**
Oregon	22	33	22	35	37	32	29	27	42	34	**313**
Pennsylvania	842	856	775	647	574	589	521	489	463	426	**6,182**
Rhode Island	5	5	7	9	6	7	7	5	7	12	**70**
South Carolina	22	25	28	30	24	40	28	24	26	23	**270**
South Dakota	-	4	2	-	2	3	1	1	1	5	**19**
Tennessee	50	41	42	50	44	47	52	46	38	48	**458**
Texas	109	109	109	110	101	128	148	163	184	147	**1,308**
Utah	27	18	30	14	18	18	23	24	12	19	**203**
Vermont	4	4	5	4	5	2	3	3	1	5	**36**
Virginia	197	178	181	178	172	168	176	195	162	147	**1,754**
Washington	48	56	64	68	78	71	71	76	71	72	**675**
West Virginia	379	324	338	305	282	316	268	269	228	212	**2,921**
Wisconsin	26	14	25	19	23	22	27	26	32	33	**247**
Wyoming	9	10	8	9	8	11	7	3	8	6	**79**
TOTAL	**3,151**	**3,115**	**2,928**	**2,791**	**2,745**	**2,864**	**2,747**	**2,718**	**2,639**	**2,531**	**28,229**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-5. All pneumoconioses: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	671	12	19.00	8	18.85	8	7,740	12	11.5	20
Alaska	28	49	5.95	35	14.82	12	292	49	10.4	44
Arizona	221	28	5.56	39	5.48	39	2,375	28	10.7	37
Arkansas	162	32	7.65	28	7.03	30	1,989	32	12.3	7
California	1,308	4	5.00	41	5.80	37	14,600	5	11.2	24
Colorado	301	23	8.89	20	11.65	17	3,248	23	10.8	35
Connecticut	201	30	7.47	29	6.77	31	2,332	29	11.6	17
Delaware	150	33	23.89	5	24.43	5	1,669	33	11.1	28
District of Columbia	10	51	2.09	51	2.28	51	156	51	15.6	2
Florida	1,070	8	8.29	23	6.25	34	11,744	8	11.0	30
Georgia	253	25	3.96	47	5.15	42	3,039	25	12.0	11
Hawaii	30	48	3.09	50	3.03	49	410	46	13.7	3
Idaho	81	40	8.15	27	8.80	25	906	40	11.2	24
Illinois	619	13	6.35	33	6.55	33	6,853	14	11.1	28
Indiana	308	22	6.45	32	6.57	32	3,455	21	11.2	24
Iowa	128	35	5.46	40	4.51	44	1,279	36	10.0	47
Kansas	96	39	4.54	43	4.35	45	1,254	38	13.1	5
Kentucky	1,237	6	37.97	3	39.71	3	14,486	6	11.7	14
Louisiana	332	20	9.53	18	10.32	20	4,420	20	13.3	4
Maine	134	34	12.87	14	11.71	16	1,446	34	10.8	35
Maryland	568	15	13.61	12	15.13	11	6,562	16	11.6	17
Massachusetts	422	19	8.22	25	7.70	26	4,430	19	10.5	43
Michigan	454	18	5.81	36	5.98	35	5,231	18	11.5	20
Minnesota	225	27	5.79	38	5.92	36	2,486	27	11.0	30
Mississippi	462	16	20.82	6	21.61	7	7,975	11	17.3	1
Missouri	198	31	4.46	44	4.22	46	2,313	30	11.7	14
Montana	101	38	13.97	11	13.27	14	1,076	39	10.7	37
Nebraska	50	45	3.71	48	3.37	48	464	45	9.3	50
Nevada	68	43	4.37	45	5.16	41	844	41	12.4	6
New Hampshire	66	44	6.71	31	7.14	29	736	43	11.2	24
New Jersey	977	9	14.65	9	14.01	13	10,315	9	10.6	41
New Mexico	125	36	8.88	21	9.83	23	1,262	37	10.1	45
New York	711	10	4.70	42	4.65	43	8,006	10	11.3	23
North Carolina	597	14	9.34	19	10.00	22	7,063	13	11.8	13
North Dakota	32	47	6.18	34	5.38	40	342	48	10.7	37
Ohio	1,182	7	13.17	13	12.67	15	12,834	7	10.9	33
Oklahoma	116	37	4.25	46	4.12	47	1,414	35	12.2	9
Oregon	313	21	11.49	16	11.20	18	3,354	22	10.7	37
Pennsylvania	6,182	1	62.50	2	51.00	2	58,404	1	9.4	49
Rhode Island	70	42	8.26	24	7.28	28	763	42	10.9	33
South Carolina	270	24	8.42	22	9.00	24	3,213	24	11.9	12
South Dakota	19	50	3.20	49	2.77	50	230	50	12.1	10
Tennessee	458	17	10.08	17	10.56	19	5,307	17	11.6	17
Texas	1,308	4	8.19	26	10.14	21	16,095	4	12.3	7
Utah	203	29	12.27	15	17.31	9	2,025	31	10.0	47
Vermont	36	46	7.30	30	7.42	27	383	47	10.6	41
Virginia	1,754	3	31.08	4	35.73	4	19,984	3	11.4	22
Washington	675	11	14.49	10	15.95	10	6,828	15	10.1	45
West Virginia	2,921	2	197.26	1	172.40	1	32,244	2	11.0	30
Wisconsin	247	26	5.80	37	5.61	38	2,894	26	11.7	14
Wyoming	79	41	20.10	7	22.48	6	723	44	9.2	51

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 6-6. All pneumoconioses: Percent of deaths by condition and state, U.S. residents age 15 and over, 1995–2004

State	Asbestosis	Silicosis	Coal Workers' Pneumoconiosis	Byssinosis	Unspecified/Other Pneumoconioses
Alabama	74.2	4.8	15.8	0.6	6.1
Alaska	85.7	7.1	3.6	-	3.6
Arizona	63.8	16.3	15.4	-	5.9
Arkansas	61.7	9.9	25.3	1.2	3.1
California	84.7	5.8	6.0	0.2	3.7
Colorado	35.9	22.6	27.6	0.7	14.3
Connecticut	84.1	9.0	3.5	-	3.5
Delaware	87.3	4.0	2.0	-	8.0
District of Columbia	40.0	30.0	20.0	-	10.0
Florida	75.3	4.9	15.5	0.3	5.2
Georgia	67.6	11.1	10.7	3.2	8.3
Hawaii	93.3	3.3	-	-	3.3
Idaho	71.6	18.5	7.4	-	2.5
Illinois	41.0	9.4	36.8	0.2	15.3
Indiana	30.8	12.3	45.8	-	12.0
Iowa	52.3	13.3	27.3	-	10.2
Kansas	69.8	7.3	17.7	1.0	5.2
Kentucky	8.3	3.0	69.8	0.2	19.4
Louisiana	83.1	7.5	7.2	-	2.4
Maine	94.8	3.0	0.7	0.7	1.5
Maryland	82.2	4.8	9.5	0.2	4.9
Massachusetts	91.2	4.5	0.2	-	4.5
Michigan	62.1	17.0	15.0	0.2	8.1
Minnesota	78.2	18.2	1.8	0.9	1.8
Mississippi	75.1	3.9	20.8	-	0.9
Missouri	68.7	16.2	10.1	0.5	5.6
Montana	75.2	13.9	8.9	1.0	2.0
Nebraska	88.0	6.0	6.0	-	-
Nevada	80.9	10.3	4.4	-	4.4
New Hampshire	86.4	6.1	4.5	-	6.1
New Jersey	89.6	3.7	4.1	0.1	3.5
New Mexico	29.6	20.0	37.6	-	12.8
New York	77.4	11.0	5.8	0.3	7.0
North Carolina	67.3	10.1	13.4	6.0	4.5
North Dakota	90.6	3.1	3.1	-	3.1
Ohio	39.3	13.5	34.3	-	15.1
Oklahoma	64.7	8.6	22.4	-	4.3
Oregon	90.1	7.0	2.2	-	1.3
Pennsylvania	16.0	4.2	68.5	<0.1	12.8
Rhode Island	80.0	18.6	1.4	1.4	-
South Carolina	81.5	6.7	7.8	3.0	1.5
South Dakota	47.4	36.8	10.5	-	5.3
Tennessee	41.0	6.3	45.4	-	9.0
Texas	85.9	8.1	4.4	0.2	2.8
Utah	27.6	12.8	37.4	-	23.2
Vermont	52.8	27.8	2.8	2.8	16.7
Virginia	29.6	2.1	55.5	0.1	13.6
Washington	92.6	3.4	3.6	0.1	0.7
West Virginia	10.7	1.6	68.6	-	20.8
Wisconsin	59.5	32.0	4.9	0.8	4.5
Wyoming	27.8	3.8	24.1	-	44.3
All	**47.3**	**6.5**	**36.9**	**0.3**	**10.3**

- indicates no deaths listed.

NOTE: Percentages may total more than 100% due to deaths with multiple pneumoconioses. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-7. All pneumoconioses: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
041	Coal mining	4,623	46.2
060	Construction	1,078	10.8
270	Blast furnaces, steelworks, rolling and finishing mills	203	2.0
360	Ship and boat building and repairing	176	1.8
392	Not specified manufacturing industries	170	1.7
192	Industrial and miscellaneous chemicals	159	1.6
400	Railroads	146	1.5
040	Metal mining	131	1.3
262	Miscellaneous nonmetallic mineral and stone products	127	1.3
901	General government, n.e.c.	105	1.1
	All other industries	2,742	27.4
	Industry not reported	354	3.5
	TOTAL	**10,014**	**100.0**

CIC - Census Industry Code n.e.c. - not elsewhere classified
NOTE: The comparable number of all pneumoconioses deaths in the entire United States for this same time period was 31,455. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-8. All pneumoconioses: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
616	Mining machine operators	4,299	42.9
889	Laborers, except construction	389	3.9
585	Plumbers, pipefitters, and steamfitters	257	2.6
019	Managers and administrators, n.e.c.	248	2.5
575	Electricians	220	2.2
567	Carpenters	198	2.0
453	Janitors and cleaners	179	1.8
804	Truck drivers	170	1.7
633	Supervisors, production occupations	167	1.7
869	Construction laborers	142	1.4
	All other occupations	3,391	33.9
	Occupation not reported	354	3.5
	TOTAL	**10,014**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of all pneumoconioses deaths in the entire United States for this same time period was 31,455. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-9. All pneumoconioses: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
041	Coal mining	4,623	33.1	32.2	34.1
262	Miscellaneous nonmetallic mineral and stone products	127	7.9	6.6	9.4
040	Metal mining	131	5.2	4.4	6.2
360	Ship and boat building and repairing	176	4.5	3.9	5.2
261	Pottery and related products	27	3.8	2.5	5.6
050	Nonmetallic mining and quarrying, except fuel	69	3.6	2.8	4.6
271	Iron and steel foundries	71	2.8	2.2	3.6
361	Railroad locomotives and equipment	7	2.7	1.1	5.5
252	Structural clay products	29	2.6	1.8	3.8
502	Lumber and construction materials	23	2.3	1.4	3.4
192	Industrial and miscellaneous chemicals	159	1.8	1.5	2.1
211	Other rubber products, and plastics footwear and belting	48	1.5	1.1	1.9
250	Glass and glass products	55	1.4	1.0	1.8

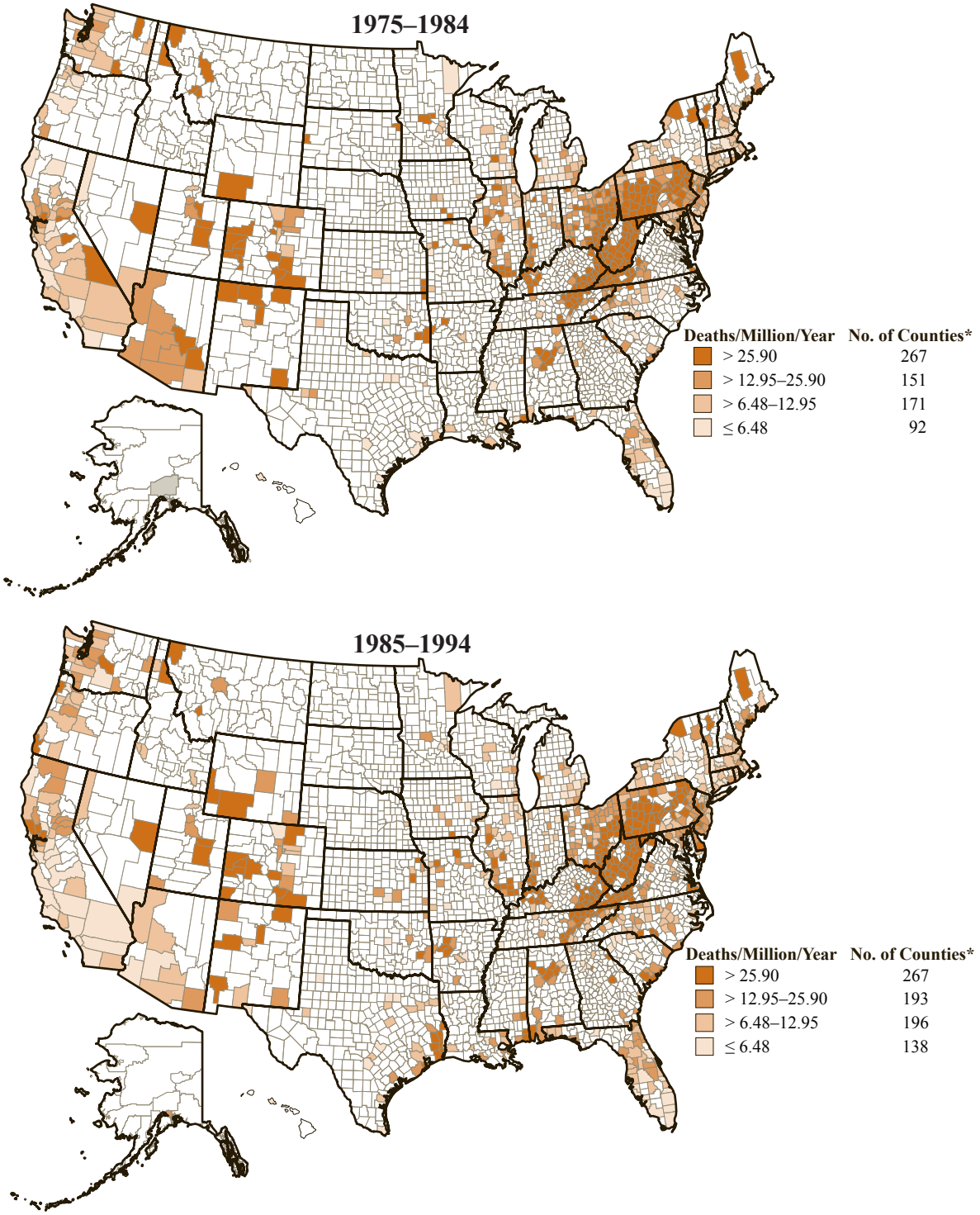
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with all pneumoconioses reported was 10,014 in these same selected states and years, and the comparable number of all pneumoconioses deaths in the entire United States for this same time period was 31,455. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 6-10. All pneumoconioses: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
616	Mining machine operators	4,299	32.8	31.8	33.8
593	Insulation workers	109	25.5	21.1	30.9
613	Supervisors, extractive occupations	73	10.7	8.5	13.6
725	Miscellaneous metal and plastic processing machine operators	11	10.5	5.2	18.7
046	Mining engineers	16	6.1	3.5	9.9
643	Boilermakers	61	5.9	4.6	7.7
615	Explosives workers	6	5.0	1.8	11.0
768	Crushing and grinding machine operators	27	4.7	3.1	6.8
787	Hand molding, casting, and forming occupations	10	4.6	2.2	8.4
617	Mining occupations, n.e.c.	26	4.2	2.7	6.1
675	Hand molders and shapers, except jewelers	16	3.7	2.1	6.0
585	Plumbers, pipefitters, and steamfitters	257	2.9	2.6	3.3
719	Molding and casting machine operators	38	2.7	1.9	3.7
843	Supervisors, material moving equipment operators	9	2.4	1.1	4.5
859	Miscellaneous material moving equipment operators	23	2.2	1.4	3.3
584	Plasterers	11	2.1	1.1	3.8
575	Electricians	220	2.1	1.8	2.4
653	Sheet metal workers	58	2.0	1.5	2.5
544	Millwrights	52	1.8	1.4	2.4
824	Locomotive operating occupations	36	1.6	1.1	2.3
783	Welders and cutters	139	1.6	1.3	1.9

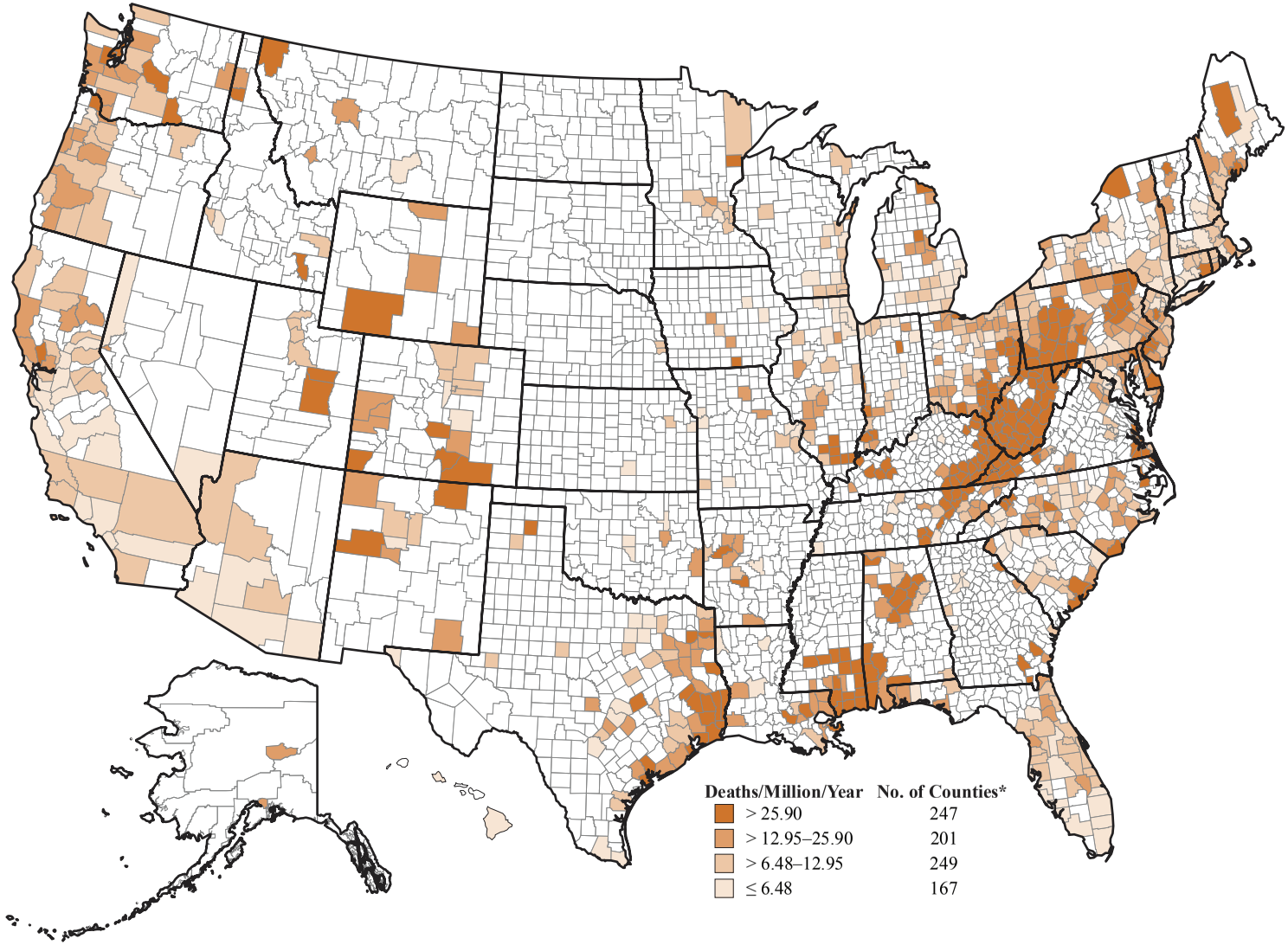
COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with all pneumoconioses reported was 10,014 in these same selected states and years, and the comparable number of all pneumoconioses deaths in the entire United States for this same time period was 31,455. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 6-3a. All pneumoconioses: Age-adjusted death rates by county, U.S. residents age 15 and over, 1975–1984 and 1985–1994



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 6-3b. All pneumoconioses: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 6-11. All pneumoconioses: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 1995–2004

County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Buchanan County	Virginia	1,442.8	1,252.9	280	0.4
McDowell County	West Virginia	986.7	1,194.9	265	0.4
Wyoming County	West Virginia	885.0	882.9	186	0.5
Raleigh County	West Virginia	745.6	845.6	552	0.0
Tazewell County	Virginia	691.6	783.9	288	0.0
Schuylkill County	Pennsylvania	622.2	949.1	1,186	0.1
Logan County	West Virginia	595.4	616.7	191	0.5
Floyd County	Kentucky	586.6	530.1	184	0.0
Dickenson County	Virginia	563.7	593.1	80	0.0
Fayette County	West Virginia	523.0	642.6	252	0.0
Mingo County	West Virginia	515.4	481.8	109	1.8
Wise County	Virginia	498.5	491.8	171	0.0
Boone County	West Virginia	461.3	467.9	97	0.0
Harlan County	Kentucky	454.5	488.5	130	0.8
Lee County	Virginia	419.5	491.1	94	1.1
Carbon County	Utah	418.8	456.7	72	0.0
Leslie County	Kentucky	391.8	358.2	36	0.0
Russell County	Virginia	388.1	393.7	95	0.0
Norton City	Virginia	354.3	407.4	13	0.0
Nicholas County	West Virginia	327.4	365.5	79	1.3
Webster County	West Virginia	316.9	366.3	29	0.0
Perry County	Kentucky	313.9	264.8	63	0.0
Mercer County	West Virginia	312.0	404.4	211	0.9
Cambria County	Pennsylvania	295.8	442.5	560	0.4
Knott County	Kentucky	294.2	264.7	38	0.0
Luzerne County	Pennsylvania	294.0	459.1	1,215	0.2
Pike County	Kentucky	288.5	260.9	146	0.0
Emery County	Utah	276.5	228.5	18	0.0
Letcher County	Kentucky	271.9	256.1	53	0.0
Lincoln County	Montana	262.5	289.1	44	18.2
Clay County	West Virginia	250.0	255.8	21	4.8
Martin County	Kentucky	247.6	203.0	20	0.0
Northumberland County	Pennsylvania	244.2	357.2	279	0.4
Hancock County	Mississippi	234.6	238.7	82	22.0
Somerset County	Pennsylvania	230.8	322.4	212	0.0
Johnson County	Kentucky	222.1	210.0	40	0.0
Muhlenberg County	Kentucky	221.6	259.6	68	0.0
Sweetwater County	Wyoming	216.6	134.1	39	0.0
George County	Mississippi	216.1	184.9	27	3.7
Lincoln County	West Virginia	215.3	206.3	37	0.0
Franklin County	Illinois	213.9	321.6	102	0.0
Bell County	Kentucky	208.4	218.0	53	0.0
Greenbrier County	West Virginia	207.1	271.3	77	0.0
Huerfano County	Colorado	183.2	245.0	16	0.0
Preston County	West Virginia	181.4	205.2	49	0.0
Fayette County	Pennsylvania	179.5	252.0	305	0.0
Las Animas County	Colorado	174.5	270.3	33	0.0
Carbon County	Pennsylvania	168.7	235.5	114	0.0
Greene County	Pennsylvania	164.6	194.3	65	0.0
Colfax County	New Mexico	156.5	209.4	24	0.0
Overall United States		**13.0**	**12.7**	**28,229**	**2.7**

NOTE: Only counties with at least 5 deaths from the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 6-12. Occupational dust diseases of the lungs: Estimated number of cases reported by employers, by industry, U.S. private sector, 1973–2001

Year	Agriculture	Mining	Construction	Manufacturing	Transportation & Public Utilities	Wholesale & Retail Trade	Finance	Services	All Industries
1973	100	-	100	700	200	200	-	100	1,500
1974	100	300	100	900	-	300	-	100	1,700
1975	-	-	200	600	-	100	-	-	1,000
1976	-	-	200	800	100	-	-	-	1,200
1977	100	200	800	700	100	100	100	100	2,000
1978	-	300	200	800	100	200	-	100	1,600
1979	-	300	200	900	100	100	-	100	1,700
1980	-	300	200	1,300	100	100	-	200	2,200
1981	-	300	200	1,500	-	-	-	100	2,100
1982	-	300	100	1,200	100	100	-	100	2,000
1983	-	200	100	900	-	200	-	200	1,700
1984	-	200	200	1,000	100	100	-	100	1,800
1985	-	200	100	800	100	200	-	200	1,700
1986	100	600	100	-	-	-	100	300	3,200
1987	-	900	500	1,200	200	-	-	400	3,400
1988	-	700	200	1,200	300	-	-	300	2,900
1989	-	500	200	1,300	100	100	-	200	2,600
1990	100	300	300	1,600	400	100	-	300	3,000
1991	100	500	200	1,000	200	-	-	300	2,500
1992	-	600	100	1,000	-	200	-	500	2,600
1993	100	600	200	900	300	-	-	600	2,700
1994	-	400	200	900	300	300	-	500	2,700
1995	-	200	100	700	200	200	-	1,100	2,700
1996	-	100	100	2,600	200	100	-	400	3,500
1997	-	100	300	900	300	200	300	800	2,900
1998	-	300	200	800	300	200	-	400	2,100
1999	-	100	100	900	300	100	100	500	2,200
2000	-	100	100	500	200	300	100	400	1,700
2001	-	100	100	400	100	200	-	300	1,300

- indicates no data reported or data that do not meet BLS publication guidelines.
NOTE: BLS stopped using the 'dust diseases of the lung' category in 2001. Since 2002, BLS has been aggregating these diseases with other occupational lung diseases in a new 'respiratory conditions' category for its annual surveys. The sum of industries may not equal the total due to rounding. See appendices for source description.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 6-13. Occupational dust diseases of the lungs: Estimated rate (based on cases reported by employers, per 10,000 full-time workers) by industry, U.S. private sector, 1973–2001

Year	Agriculture	Mining	Construction	Manufacturing	Transportation & Public Utilities	Wholesale & Retail Trade	Finance	Services	Overall
1973	1.3	0.5	0.4	0.4	0.3	0.2	0.1	0.1	0.3
1974	0.8	4.8	0.3	0.4	-	0.2	0.0	0.1	0.3
1975	0.4	0.2	0.6	0.4	0.1	-	-	-	0.2
1976	0.2	0.1	0.5	0.4	0.2	-	-	-	0.2
1977	1.3	2.0	2.5	0.4	0.1	-	0.1	0.1	0.3
1978	0.3	4.0	0.6	0.4	0.1	0.1	-	-	0.3
1979	0.1	3.4	0.5	0.4	0.1	0.1	-	0.1	0.3
1980	0.4	3.3	0.6	0.7	0.1	0.1	-	0.1	0.4
1981	0.3	2.5	0.5	0.8	0.1	-	-	0.1	0.3
1982	0.4	3.2	0.3	0.7	0.2	0.1	-	0.1	0.3
1983	0.4	1.9	0.4	0.5	0.1	0.1	-	0.1	0.3
1984	0.4	1.7	0.5	0.5	0.2	0.1	-	0.1	0.3
1985	0.5	2.7	0.3	0.4	0.2	0.1	-	0.1	0.2
1986	1.0	8.4	0.3	0.9	-	-	-	0.1	0.5
1987	0.5	12.9	1.2	0.6	0.3	-	-	0.2	0.5
1988	-	10.2	0.5	0.6	0.6	-	-	0.1	0.4
1989	0.2	7.5	0.5	0.7	0.2	-	-	0.1	0.3
1990	0.6	4.4	0.6	0.9	0.7	-	-	0.1	0.4
1991	0.5	7.3	0.4	0.5	0.3	-	-	0.1	0.3
1992	0.2	9.0	0.3	0.6	-	0.1	-	0.2	0.3
1993	0.5	8.7	0.4	0.5	0.5	-	-	0.3	0.3
1994	0.3	6.6	0.5	0.5	0.5	0.1	0.1	0.2	0.3
1995	0.1	3.4	0.3	0.4	0.4	0.1	0.1	0.5	0.3
1996	0.1	1.6	0.1	1.4	0.3	-	0.1	0.2	0.4
1997	0.3	1.7	0.5	0.5	0.5	0.1	0.5	0.3	0.3
1998	0.2	4.3	0.3	0.4	0.4	0.1	0.1	0.2	0.2
1999	0.2	2.2	0.1	0.5	0.5	0.1	0.1	0.2	0.2
2000	0.2	1.7	0.1	0.3	0.3	0.1	0.1	0.2	0.2
2001	0.1	1.7	0.1	0.2	0.2	0.1	-	0.1	0.1

- indicates no data reported or data that do not meet BLS publication guidelines.
NOTE: BLS stopped using the 'dust diseases of the lung' category in 2001. Since 2002, BLS has been aggregating these diseases with other occupational lung diseases in a new 'respiratory conditions' category for its annual surveys. See appendices for source description.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 6-14a (1 of 2). Occupational dust diseases of the lungs: Industries with highest estimated incidence rates (based on cases reported by employers) by industry, U.S. private sector, 1996–2001

Year/Industry	SIC	Estimated Number of Cases	Rate (per 10,000 full-time workers)
1996			
Coal mining	12	100	8.6
Primary metal industries	33	200	2.2
Local and interurban passenger transit	41	100	1.7
Chemical and allied products	28	100	1.1
Transportation equipment	37	200	1.0
Electric, gas, and sanitary services	49	100	0.9
Lumber and wood products	24	100	0.9
Nonmetallic minerals, except fuels	14	-	0.9
Stone, clay, and glass products	32	-	0.9
Transportation by air	45	100	0.6
ALL INDUSTRIES		**3,500**	**0.4**
1997			
Coal mining	12	100	9.5
Fishing, hunting, and trapping	09	-	7.8
Local and interurban passenger transit	41	100	3.7
Primary metal products	33	100	1.8
Insurance carriers	63	200	1.4
Metal mining	10	-	0.9
Nonmetallic minerals, except fuels	14	-	0.9
General building contractors	15	100	0.9
Fabricated metal products	34	100	0.9
Electric, gas, and sanitary services	49	100	0.9
ALL INDUSTRIES		**2,900**	**0.3**
1998			
Coal mining	12	200	25.3
Museums, botanical, zoological gardens	84	-	4.7
Nonmetallic minerals, except fuels	14	-	2.3
Electric, gas, and sanitary services	49	200	2.3
Primary metal industries	33	100	2.0
Transportation equipment	37	300	1.4
Agricultural production livestock	02	-	0.9
Local and interurban passenger transit	41	-	0.9
Stone, clay, and glass products	32	-	0.8
Leather and leather products	31	-	0.8
ALL INDUSTRIES		**2,100**	**0.2**

See footnotes at end of table.

Table 6-14a (2 of 2). Occupational dust diseases of the lungs: Industries with highest estimated incidence rates (based on cases reported by employers) by industry, U.S. private sector, 1996–2001

Year/Industry	SIC	Estimated Number of Cases	Rate (per 10,000 full-time workers)
1999			
Coal mining	12	100	13.0
Primary metal industries	33	200	3.2
Water transportation	44	-	1.9
Electric, gas, and sanitary services	49	100	1.7
Chemicals and allied products	28	200	1.7
Legal services	81	200	1.7
Leather and leather products	31	-	1.2
Transportation equipment	37	200	1.0
Textile mill products	22	-	0.7
Trucking and warehousing	42	100	0.7
ALL INDUSTRIES		**2,200**	**0.2**
2000			
Coal mining	12	100	10.4
Forestry	08	-	10.2
Metal mining	10	-	1.2
Tobacco products	21	-	1.2
Water transportation	44	-	1.2
Nonmetallic minerals, except fuels	14	-	0.9
Electric, gas, and sanitary services	49	100	0.8
Primary metal industries	33	-	0.6
Transportation equipment	37	100	0.5
Petroleum and coal products	29	-	0.5
ALL INDUSTRIES		**1,700**	**0.2**
2001			
Coal mining	12	100	9.9
Metal mining	10	-	1.3
Nonmetallic mineral, except fuels	14	-	1.2
Textile mill products	22	-	0.6
Primary metal industries	33	-	0.5
Transportation equipment	37	100	0.5
Electric, gas, and sanitary services	49	-	0.5
Heavy construction, except building	16	-	0.4
Electric and other electric equipment	36	100	0.4
Transportation by air	45	-	0.4
ALL INDUSTRIES		**1,300**	**0.1**

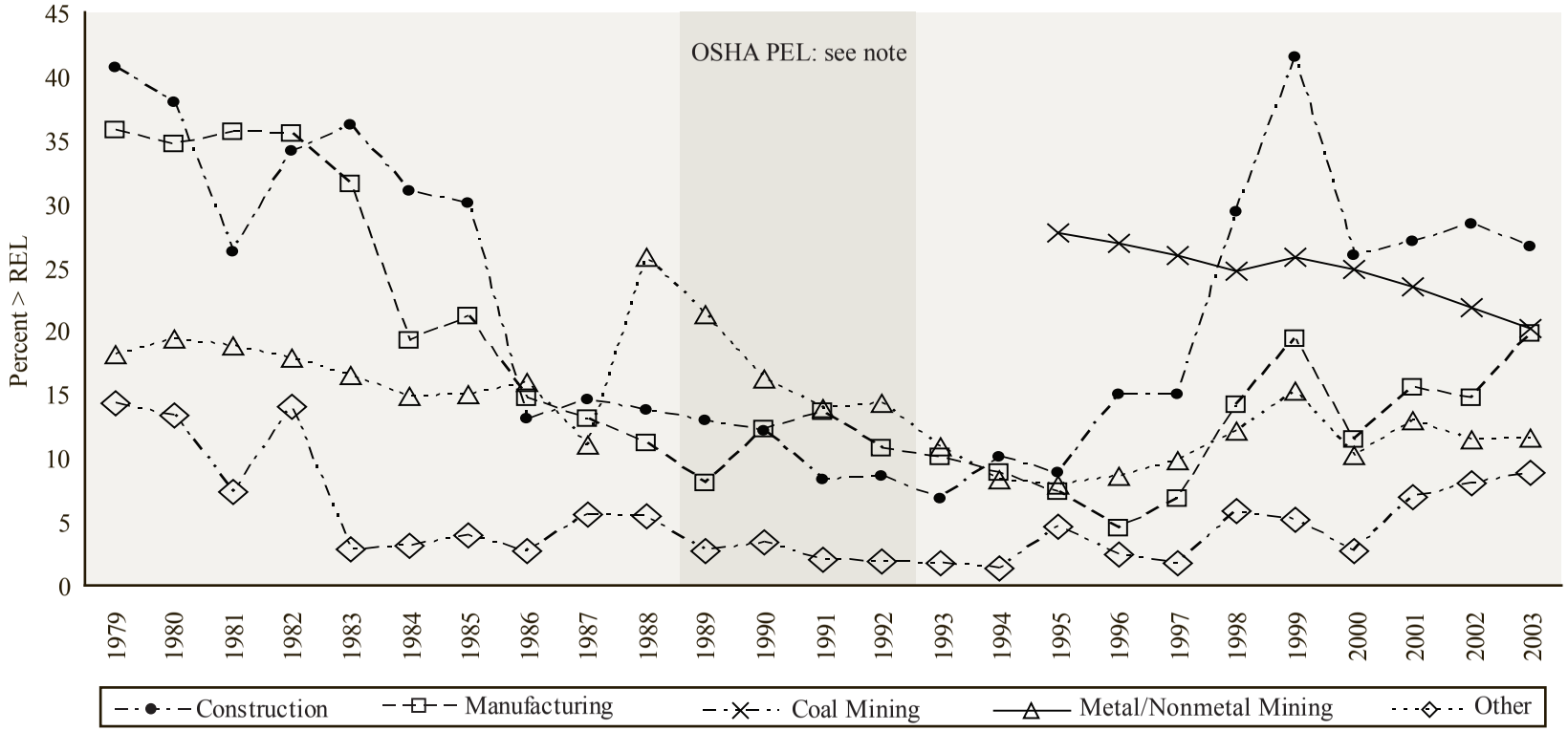
- indicates no data reported or data that do not meet BLS publication guidelines. SIC - Standard Industrial Classification
NOTE: See appendices for source description and method.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 6-14b. Occupational respiratory conditions: Industries with highest estimated incidence rates (based on cases reported by employers) by industry, U.S. private sector, 2002–2004

Year/Industry	Code	Estimated Number of Cases	Rate (per 10,000 full-time workers)
2002	**SIC**		
Coal mining	12	100	13.9
Agriculture production-livestock	02	200	13.5
Health services	80	6,000	7.1
Local and interurban passenger transit	41	200	6.5
Hotel and other lodging places	70	700	5.4
Primary metal industries	33	300	4.7
Forestry	08	-	4.6
Museums botanical, zoological gardens	84	-	4.5
Fabricated metal products	34	500	4.1
Food and kindred products	20	700	4.0
ALL INDUSTRIES		**22,000**	**2.5**
2003	**NAICS**		
Healthcare and social assistance	62	6,400	5.9
Manufacturing	31–33	3,600	2.5
Mining	21	100	2.3
Transportation and warehousing	48–49	800	2.2
Utilities	22	100	2.2
Agriculture, forestry, fishing and hunting	11	200	2.1
Arts, entertainment, and recreation	71	200	2.1
Real estate and rental and leasing	53	300	1.7
Construction	23	900	1.6
Accommodation and food services	72	1,100	1.6
ALL INDUSTRIES		**19,000**	**2.2**
2004	**NAICS**		
Healthcare and social assistance	62	5,700	5.2
Arts, entertainment, and recreation	71	300	2.7
Manufacturing	31–33	3,800	2.6
Administrative and support and waste management and remediation services	56	1,100	2.5
Educational services	61	300	2.3
Utilities	22	100	2.2
Agriculture, forestry, fishing and hunting	11	200	2.0
Transportation and warehousing	48–49	700	1.8
Real estate and rental and leasing	53	200	1.4
Wholesale trade	42	700	1.3
ALL INDUSTRIES		**17,600**	**2.0**

- indicates no data reported or data that do not meet BLS publication guidelines. SIC - Standard Industrial Classification
NAICS - North American Industry Classification System
NOTE: In 2002, respiratory conditions is a new reporting category. See appendices for source description and method.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Figure 6-4. Pneumoconiotic agents: Percent of exposures exceeding the NIOSH recommended exposure limits by major industry division, MSHA inspector and mine operator and OSHA samples, 1979–2003



REL - recommended exposure limit PEL - permissible exposure limit MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration

NOTE: From March 1, 1989 to March 22, 1993, the OSHA PELs in force differed from those employed before and after those dates. The NIOSH REL for respirable coal mine dust of 1.0 mg/m^3 was adopted in September 1995. The MSHA respirable coal mine quartz exposure data and the NIOSH REL for respirable quartz cannot be compared to each other because they are based on different sampling criteria. See appendices for source description, methods, and agents.

SOURCE: MSHA metal/nonmetal mine and coal mine inspector and mine operator dust and quartz data. OSHA Integrated Management Information System.

Table 6-15a. Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by type of mining, MSHA inspector and mine operator samples, 1979–2003

	Coal Mining (SIC 11, 12)				Metal/Nonmetal Mining (SIC 10,14)			
Year	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
1979	207,430	17.0	0	-	9,953	11.6	9,411	18.3
1980	254,581	15.4	0	-	6,988	10.8	6,513	19.6
1981	77,764	11.0	0	-	7,474	11.0	6,826	19.0
1982	136,332	11.1	0	-	3,153	10.5	2,741	18.1
1983	136,373	10.4	0	-	7,075	12.1	6,418	16.7
1984	139,050	10.6	0	-	8,008	11.7	7,473	15.1
1985	129,333	9.8	0	-	6,996	12.4	6,406	15.2
1986	119,961	10.6	0	-	7,279	10.9	6,898	16.2
1987	112,131	10.7	0	-	6,761	8.9	6,369	11.2
1988	108,340	9.9	0	-	7,722	17.7	7,333	25.9
1989	102,885	9.4	0	-	8,990	14.9	8,629	21.5
1990	100,728	8.7	0	-	11,304	11.1	10,899	16.4
1991	93,355	12.0	0	-	13,100	9.4	12,791	14.1
1992	89,391	11.4	0	-	12,707	9.0	12,473	14.5
1993	82,689	10.7	0	-	11,038	7.1	10,660	11.1
1994	80,991	10.5	0	-	17,199	5.4	16,526	8.4
1995	76,723	10.6	21,393	-	13,611	5.2	13,034	8.1
1996	71,315	9.3	65,834	-	19,205	5.4	17,253	8.8
1997	78,008	9.2	70,514	-	8,597	6.0	8,125	9.9
1998	87,273	9.1	77,999	-	4,758	6.4	4,599	12.4
1999	96,118	8.6	84,706	-	5,291	7.8	5,016	15.5
2000	88,377	7.7	77,321	-	9,069	5.6	8,786	10.4
2001	96,329	7.2	79,238	-	6,719	6.4	6,378	13.2
2002	83,064	6.3	69,365	-	7,794	5.4	7,602	11.6
2003	69,955	5.5	62,890	-	9,408	6.0	9,136	11.7

- indicates incalculable field. SIC - Standard Industrial Classification PEL - permissible exposure limit REL - recommended exposure limit
MSHA - Mine Safety and Health Administration
NOTE: The NIOSH REL for respirable coal mine dust of 1.0 mg/m^3 was adopted in September 1995. The MSHA coal mine quartz exposure data cannot be compared to the NIOSH REL because they are based on different sampling criteria. See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data and coal mine inspector and mine operator dust and quartz data.

Table 6-15b. Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by major industry division, OSHA samples, 1979–2003

Year	Construction (SIC 15–17)				Manufacturing (SIC 20–39)				Other (SIC 1–9, 13, 40–99)			
	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
1979	135	13.3	127	40.9	1,997	14.8	1,431	35.9	219	3.7	138	14.5
1980	309	16.2	262	38.2	3,212	16.1	2,322	34.8	239	4.6	185	13.5
1981	194	6.2	144	26.4	3,194	16.2	1,959	35.8	144	5.6	93	7.5
1982	218	11.0	204	34.3	3,665	14.5	2,189	35.6	92	4.3	77	14.3
1983	599	7.0	498	36.3	3,199	12.7	1,961	31.7	591	1.2	530	3.0
1984	784	7.0	720	31.3	4,925	8.1	3,073	19.4	1,185	0.8	1,018	3.2
1985	650	9.1	586	30.2	5,663	10.1	3,578	21.4	952	1.8	853	4.1
1986	452	4.9	362	13.3	4,316	6.5	2,583	14.9	1,016	2.2	788	2.9
1987	394	8.6	325	14.8	5,757	6.4	3,471	13.2	1,111	4.4	974	5.7
1988	436	9.4	357	14.0	5,741	5.5	3,346	11.4	1,038	3.8	804	5.6
1989	408	9.8	334	13.2	4,978	5.7	2,781	8.2	1,085	2.7	865	2.9
1990	527	8.7	366	12.3	5,913	7.2	3,326	12.4	1,041	3.2	744	3.5
1991	536	7.6	377	8.5	5,243	7.0	3,080	13.9	1,064	1.7	801	2.2
1992	657	5.5	460	8.7	5,007	5.5	2,911	10.9	735	1.0	547	2.0
1993	522	4.8	347	6.9	3,953	4.8	2,277	10.3	649	0.6	485	1.9
1994	298	8.4	204	10.3	3,483	4.4	2,165	9.1	626	1.3	511	1.6
1995	210	10.5	143	9.1	3,649	4.1	2,491	7.6	658	3.5	487	4.7
1996	424	14.6	282	15.2	3,553	3.3	3,024	4.6	697	2.0	547	2.6
1997	500	8.8	355	15.2	3,945	4.3	3,070	7.0	648	1.2	521	1.9
1998	397	21.9	315	29.5	3,157	8.8	2,544	14.4	393	3.1	300	6.0
1999	325	28.3	259	41.7	2,915	9.0	1,900	19.6	327	4.0	242	5.4
2000	335	18.2	260	26.2	2,284	5.3	1,399	11.6	408	2.2	277	2.9
2001	267	17.6	213	27.2	1,321	7.0	815	15.7	185	2.7	126	7.1
2002	243	16.0	196	28.6	1,273	7.3	777	14.9	226	4.9	159	8.2
2003	230	22.2	209	26.8	1,244	8.4	729	20.0	212	5.7	143	9.1

SIC - Standard Industrial Classification PEL - permissible exposure limit REL - recommended exposure limit OSHA - Occupational Safety and Health Administration

NOTE: From March 1, 1989 to March 22, 1993, the OSHA PELs in force differed from those employed before and after those dates. See appendices for source description, methods, and agents.
SOURCE: OSHA Integrated Management Information System.

Table 6-16 (page 1 of 3). Pneumoconiotic agents: Number of samples and percent of exposures exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003

CIC	Industry	No. of Samples	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
150	Miscellaneous textile mill products	43	43	23.3	41	53.7
262	Miscellaneous nonmetallic mineral and stone products	860	851	22.1	791	37.0
252	Structural clay products	339	335	21.8	329	33.7
271	Iron and steel foundries	3,295	3,186	18.7	2,487	33.1
261	Pottery and related products	241	240	17.9	226	32.7
041	Coal mining	910,843	910,843	8.6	609,261	24.6†
530	Machinery, equipment, and supplies	123	105	11.4	82	23.2
251	Cement, concrete, gypsum, and plaster products	740	706	14.2	664	22.4
742	Business services, n.e.c.	28	25	8.0	23	21.7
060	Construction	3,863	3,751	14.8	2,783	21.3
892	Miscellaneous professional and related services	35	34	17.6	29	20.7
142	Yarn, thread, and fabric mills	280	279	13.3	277	19.5
042	Oil and gas extraction	52	52	11.5	33	18.2
502	Lumber and construction materials	118	111	7.2	77	18.2
201	Miscellaneous petroleum and coal products	83	83	10.8	81	14.8
191	Agricultural chemicals	53	47	6.4	41	14.6
722	Services to dwellings and other buildings	35	34	11.8	28	14.3
040	Metal mining	11,435	11,435	6.9	8,399	13.6
990	Industry not reported	141	138	7.2	104	13.5
891	Research, development and testing services	47	43	11.6	32	12.5
211	Other rubber products, and plastics footwear and belting	223	206	8.7	187	12.3
050	Nonmetallic mining and quarrying, except fuel	101,224	101,224	5.8	98,685	10.0
180	Plastics, synthetics, and resins	53	52	3.8	42	9.5
752	Electrical repair shops	30	28	3.6	21	9.5
250	Glass and glass products	310	295	4.4	243	8.6
140	Dyeing and finishing textiles, except wool and knit goods	59	59	8.5	59	8.5
551	Farm-product raw materials	12	12	0.0	12	8.3
682	Miscellaneous retail stores	44	41	4.9	36	8.3
212	Miscellaneous plastics products	330	317	4.4	266	8.3
272	Primary aluminum industries	727	673	4.2	523	8.0
331	Machinery, except electrical, n.e.c.	2,328	1,958	4.1	1,222	8.0
190	Paints, varnishes, and related products	106	101	5.0	75	8.0
360	Ship and boat building and repairing	325	277	10.5	164	7.9
372	Medical, dental, optical instruments and supplies	121	104	3.8	97	7.2
380	Photographic equipment and supplies	19	17	5.9	14	7.1
731	Personnel supply services	25	21	4.8	15	6.7
471	Sanitary services	165	158	3.8	107	6.5
241	Miscellaneous wood products	124	108	1.9	93	6.5
320	Metalworking machinery	995	870	2.5	627	6.4
192	Industrial and miscellaneous chemicals	425	417	3.4	336	6.3

See footnotes at end of table.

Table 6-16 (page 2 of 3). Pneumoconiotic agents: Number of samples and percent of exposures exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003

CIC	Industry	No. of Samples	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
280	Other primary metal industries	2,354	2,282	3.5	1,443	5.8
580	Lumber and building material retailing	19	18	0.0	18	5.6
210	Tires and inner tubes	66	66	3.0	55	5.5
932	National security and international affairs	80	80	5.0	75	5.3
300	Miscellaneous fabricated metal products	3,537	3,064	3.3	1,932	5.2
311	Farm machinery and equipment	897	822	2.4	406	5.2
760	Miscellaneous repair services	625	500	3.4	290	4.5
411	Warehousing and storage	58	49	4.1	46	4.3
110	Grain mill products	25	25	4.0	24	4.2
901	General government, n.e.c.	92	88	2.3	72	4.2
152	Miscellaneous fabricated textile products	40	25	4.0	25	4.0
391	Miscellaneous manufacturing industries	686	567	2.1	462	3.9
351	Motor vehicles and motor vehicle equipment	2,896	2,351	2.1	1,236	3.9
930	Administration of environmental quality and housing programs	38	36	0.0	27	3.7
231	Sawmills, planning mills, and millwork	206	181	2.8	165	3.6
420	Water transportation	93	93	3.2	58	3.4
282	Fabricated structural metal products	4,423	3,579	2.4	2,021	3.3
160	Pulp, paper, and paperboard mills	49	39	2.6	31	3.2
900	Executive and legislative offices	37	36	2.8	35	2.9
840	Health services, n.e.c.	89	89	2.2	71	2.8
312	Construction and material handling machines	1,279	1,089	1.8	630	2.5
310	Engines and turbines	75	72	1.4	40	2.5
232	Wood buildings and mobile homes	165	123	5.7	83	2.4
390	Toys, amusement, and sporting goods	200	189	2.1	129	2.3
531	Scrap and waste materials	689	622	1.6	358	2.2
371	Scientific and controlling instruments	242	211	1.4	183	2.2
910	Justice, public order, and safety	167	160	1.3	146	2.1
751	Automotive repair and related services	764	710	1.4	536	2.1
410	Trucking service	68	66	0.0	52	1.9
340	Household appliances	122	94	0.0	53	1.9
370	Cycles and miscellaneous transportation equipment	310	228	0.0	116	1.7
291	Metal forgings and stampings	905	701	1.1	351	1.7
290	Screw machine products	86	84	1.2	59	1.7
352	Aircraft and parts	237	225	1.3	179	1.7

See footnotes at end of table.

Table 6-16 (page 3 of 3). Pneumoconiotic agents: Number of samples and percent of exposures exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003

CIC	Industry	No. of Samples	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
270	Blast furnaces, steelworks, rolling and finishing mill	677	619	1.1	356	1.4
281	Cutlery, handtools, and general hardware	343	277	0.7	210	1.0
341	Radio, T.V. and communication equipment	123	102	1.0	106	0.9
342	Electrical machinery, equipment, and supplies, n.e.c.	1,649	1,459	0.8	1,278	0.9
242	Furniture and fixtures	640	513	0.4	325	0.6
	All other industries*	2,478	2,307	0.5	1,884	0.6
	TOTAL	**1,067,828**	**1,063,120**	**8.2**	**744,178**	**22.0**

CIC - Census Industry Code n.e.c. - not elsewhere classified PEL - permissible exposure limit REL - recommended exposure limit
MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
* includes all industries with no samples exceeding the REL or industries with less than 10 samples.
† The % of samples exceeding the NIOSH REL for respirable quartz cannot be calculated using MSHA respirable coal mine quartz dust data.
NOTE: See appendices for source description, methods and agents.
SOURCE: MSHA coal mine inspector and mine operator dust and quartz data and metal/nonmetal data. OSHA Integrated Management Information System.

Table 6-17 (page 1 of 2). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by MSHA coal mine district and states, MSHA inspector and mine operator samples, 1979–2003

MSHA Coal Mine District	All years				1979–1988		1989–1992		1993–2003			
	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with PEL	% > PEL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
District 1 (Anthracite coal mining regions in Pennsylvania)	**49,722**	**3.4**	**14,480**	**9.6**	**20,949**	**3.3**	**7,954**	**2.7**	**20,819**	**3.9**	**14,480**	**9.6**
District 2 (Bituminous coal mining regions in Pennsylvania)	**332,828**	**9.3**	**62,327**	**22.3**	**201,889**	**10.2**	**38,140**	**10.6**	**92,799**	**6.6**	**62,327**	**22.3**
District 3	**294,167**	**10.9**	**52,610**	**24.3**	**177,148**	**13.3**	**35,996**	**8.5**	**81,023**	**6.6**	**52,610**	**24.3**
Maryland	12,667	9.8	4,085	30.0	5,385	13.9	1,176	8.7	6,106	6.3	4,085	30.0
Ohio	97,527	13.7	14,884	23.6	65,280	17.1	9,974	8.6	22,273	6.1	14,884	23.6
Northern West Virginia	183,973	9.4	33,641	23.9	106,483	10.9	24,846	8.5	52,644	6.9	33,641	23.9
District 4 (Southern West Virginia)	**533,393**	**13.3**	**113,657**	**25.0**	**294,499**	**15.5**	**74,425**	**11.2**	**164,469**	**10.3**	**113,657**	**25.0**
District 5 (Virginia)	**337,929**	**9.2**	**69,913**	**18.8**	**180,870**	**10.3**	**51,439**	**9.2**	**105,620**	**7.2**	**69,913**	**18.8**
District 6 (Eastern Kentucky)	**339,688**	**8.0**	**99,642**	**19.5**	**144,650**	**7.8**	**49,965**	**8.8**	**145,073**	**8.0**	**99,642**	**19.5**
District 7	**318,519**	**8.0**	**84,366**	**20.1**	**133,009**	**8.2**	**55,562**	**7.9**	**129,948**	**7.8**	**84,366**	**20.1**
Northern Georgia	29	0	0	-	29	0	0	-	0	-	0	-
Central Kentucky	267,128	8.1	76,461	20.4	103,180	8.5	46,154	8.0	117,794	7.9	76,461	20.4
North Carolina	9	0	0	-	2	0	7	0	0	-	0	-
South Carolina	0	-	0	-	0	-	0	-	0	-	0	-
Tennessee	51,348	7.1	7,900	16.8	29,798	7.1	9,401	7.6	12,149	6.8	7,900	16.8
District 8	**173,167**	**15.1**	**34,787**	**49.5**	**95,203**	**15.3**	**25,540**	**13.8**	**52,424**	**15.5**	**34,787**	**49.5**
Illinois	151,869	15.5	27,279	50.5	86,421	16.2	23,089	14.5	42,359	14.9	27,279	50.5
Indiana	19,511	12.7	7,487	45.8	7,292	6.8	2,274	7.1	9,945	18.4	7,487	45.8
Iowa	940	6.4	0	-	794	6.5	127	6.3	19	0	0	-
Michigan	0	-	0	-	0	-	0	-	0	-	0	-
Minnesota	0	-	0	-	0	-	0	-	0	-	0	-
Northern Missouri	847	3.3	21	0	696	3.0	50	0	101	6.9	21	0
Wisconsin	0	-	0	-	0	-	0	-	0	-	0	-

See footnotes at end of table.

Table 6-17 (page 2 of 2). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by MSHA coal mine district and states, MSHA inspector and mine operator samples, 1979–2003

	All years				1979–1988		1989–1992		1993–2003			
MSHA Coal Mine District	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with PEL	% > PEL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
District 9	**142,601**	**16.1**	**32,585**	**30.3**	**74,099**	**20.3**	**21,045**	**16.9**	**47,457**	**9.2**	**32,585**	**30.3**
Alaska	280	5.4	35	2.9	179	7.3	54	3.7	47	0	35	2.9
Arizona	1,075	4.5	322	1.2	424	6.1	208	2.9	443	3.6	322	1.2
Arkansas	461	3.5	167	6.0	232	4.3	33	6.1	196	2.0	167	6.0
California	13	0	11	9.1	0	-	0	-	13	0	11	9.1
Colorado	45,127	19.2	9,878	37.7	24,305	24.8	6,353	18.7	14,469	10.1	9,878	37.7
Hawaii	0	-	0	-	0	-	0	-	0	-	0	-
Idaho	0	-	0	-	0	-	0	-	0	-	0	-
Kansas	587	3.1	120	0.8	366	4.4	69	0	152	1.3	120	0.8
Louisiana	205	0	117	4.3	12	0	23	0	170	0	117	4.3
Southern Missouri	801	3.0	210	7.6	436	3.7	59	1.7	306	2.3	210	7.6
Montana	2,151	6.5	689	4.9	1,084	8.5	155	5.8	912	4.3	689	4.9
Nebraska	0	-	0	-	0	-	0	-	0	-	0	-
Nevada	0	-	0	-	0	-	0	-	0	-	0	-
New Mexico	6,656	17.4	1,719	8.7	3,543	24.4	612	18.1	2,501	7.3	1,719	8.7
North Dakota	1,572	1.8	316	0.9	972	2.2	225	2.2	375	0.5	316	0.9
Oklahoma	5,752	8.0	1,306	11.3	2,810	9.6	983	10.0	1,959	4.6	1,306	11.3
Oregon	0	-	0	-	0	-	0	-	0	-	0	-
Texas	4,722	2.5	1,073	2.5	2,608	2.3	607	5.6	1,507	1.7	1,073	2.5
Utah	61,540	17.9	13,607	38.7	31,524	22.1	10,141	18.6	19,875	11.0	13,607	38.7
Washington	417	1.2	163	3.1	124	0	41	4.9	252	1.2	163	3.1
Wyoming	11,242	11.5	2,852	16.9	5,480	12.8	1,482	14.9	4,280	8.6	2,852	16.9
District 10 (Western Kentucky)	**93,859**	**12.7**	**20,122**	**48.3**	**48,971**	**12.6**	**13,037**	**13.9**	**31,851**	**12.5**	**20,122**	**48.3**
District 11	**102,623**	**12.6**	**24,771**	**28.0**	**50,008**	**16.0**	**13,256**	**12.7**	**39,359**	**8.3**	**24,771**	**28.0**
Alabama	102,574	12.6	24,722	28.0	50,008	16.0	13,256	12.7	39,310	8.3	24,722	28.0
Central and Southern Georgia	0	-	0	-	0	-	0	-	0	-	0	-
Florida	0	-	0	-	0	-	0	-	0	-	0	-
Mississippi	46	0	46	0	0	-	0	-	46	0	46	0
Puerto Rico	0	-	0	-	0	-	0	-	0	-	0	-
Virgin Islands	0	-	0	-	0	-	0	-	0	-	0	-
TOTAL	**2,718,496**	**10.8**	**609,260**	**24.6**	**1,421,295**	**12.3**	**386,359**	**10.3**	**910,842**	**8.6**	**609,260**	**24.6**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit MSHA - Mine Safety and Health Administration

NOTE: The NIOSH REL for respirable coal mine dust of 1.0 mg/m^3 was adopted in September 1995. The MSHA respirable coal mine quartz exposure data and the NIOSH REL for respirable quartz cannot be compared to each other because they are based on different sampling criteria. See appendices for source description, methods, and agents.

SOURCE: MSHA coal mine inspector and mine operator dust and quartz data.

Table 6-18 (page 1 of 2). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by MSHA metal/nonmetal district and state, MSHA samples, 1979–2003

MSHA Metal/Nonmetal Mine District	1979–1988				1989–1992				1993–2003			
	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
Northeast	**10,176**	**12.6**	**9,471**	**20.9**	**6,612**	**10.1**	**6,311**	**15.7**	**19,807**	**5.9**	**18,970**	**11.2**
Connecticut	351	26.2	308	36.0	167	13.2	162	22.2	618	3.2	525	5.3
Delaware	30	33.3	23	0.0	33	0.0	33	3.0	112	1.8	76	0.0
District of Columbia	0	-	0	-	0	-	0	-	0	-	0	-
Maine	207	15.9	201	24.4	169	3.0	169	7.7	572	5.4	572	12.1
Maryland	563	4.1	556	10.1	364	3.3	341	6.7	974	2.6	935	5.7
Massachusetts	497	17.5	483	28.2	263	9.9	256	15.6	963	5.0	951	10.4
New Hampshire	132	15.2	132	33.3	133	7.5	133	16.5	489	5.5	480	13.3
New Jersey	1,055	17.0	1,013	28.1	625	12.3	623	20.1	1,201	4.1	1,195	8.5
New York	2,221	11.5	1,970	17.9	1,733	6.6	1,679	11.6	4,553	5.0	4,320	9.7
Pennsylvania	2,413	9.6	2,351	15.1	1,371	13.4	1,286	19.4	4,782	7.0	4,545	12.8
Rhode Island	64	23.4	60	35.0	35	8.6	35	25.7	185	11.4	176	19.9
Vermont	708	15.8	549	47.5	350	20.0	348	27.9	1,157	16.8	1,157	28.9
Virginia	1,312	8.6	1,215	13.2	939	9.1	869	12.7	3,249	4.1	3,161	7.6
West Virginia	623	17.5	610	24.3	430	13.0	377	18.6	952	6.3	877	11.1
Southeast	**15,562**	**7.9**	**14,577**	**12.2**	**9,936**	**8.2**	**9,560**	**12.4**	**21,391**	**4.7**	**20,698**	**8.4**
Alabama	1,097	4.4	1,055	6.5	876	8.0	876	11.9	1,865	5.4	1,840	8.7
Florida	1,215	5.3	966	6.4	841	2.1	836	5.0	2,429	1.7	2,339	2.7
Georgia	2,526	11.0	2,494	19.6	1,585	10.5	1,576	15.2	2,801	6.3	2,792	9.7
Kentucky	1,055	7.8	998	10.1	534	9.4	501	11.0	1,487	4.5	1,484	6.1
Mississippi	301	4.3	286	6.3	480	5.4	478	8.2	1,321	5.8	1,312	9.8
North Carolina	3,480	6.6	3,385	11.3	2,223	6.7	2,199	11.0	3,801	4.4	3,732	8.5
Puerto Rico	1,106	5.9	788	0.3	230	10.0	114	3.5	1,041	2.8	877	3.2
South Carolina	1,176	16.2	1,145	27.5	1,371	8.8	1,235	14.8	2,821	3.4	2,584	7.9
Tennessee	3,517	7.1	3,401	9.8	1,774	10.5	1,735	16.0	3,752	6.7	3,683	12.6
Virgin Islands	89	6.7	59	0.0	22	9.1	10	0.0	73	1.4	55	5.5
North Central	**14,704**	**10.0**	**13,332**	**13.5**	**8,922**	**11.0**	**8,755**	**15.6**	**21,274**	**5.3**	**20,614**	**9.4**
Illinois	3,046	17.6	2,912	20.4	1,414	13.0	1,396	19.2	3,260	5.3	3,094	9.4
Indiana	1,247	4.2	1,204	3.2	929	4.7	925	5.9	2,455	3.0	2,391	5.3
Iowa	692	5.5	681	5.1	573	5.2	572	4.9	1,263	2.7	1,257	4.2
Michigan	2,062	8.0	1,577	13.8	1,559	14.6	1,506	19.5	3,339	6.3	3,174	10.9
Minnesota	4,477	7.0	3,846	10.9	1,663	10.6	1,594	16.2	3,377	5.4	3,220	9.7
Ohio	1,414	14.1	1,387	18.8	1,716	9.0	1,713	14.4	4,648	6.2	4,607	11.0
Wisconsin	1,766	9.4	1,725	13.2	1,068	15.7	1,049	20.6	2,932	5.6	2,871	10.6

See footnotes at end of table.

Table 6-18 (page 2 of 2). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by MSHA metal/nonmetal district and state, MSHA samples, 1979–2003

MSHA Metal/Nonmetal Mine District	1979–1988				1989–1992				1993–2003			
	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
South Central	**8,315**	**13.4**	**7,860**	**17.9**	**9,558**	**9.4**	**9,483**	**13.6**	**21,378**	**5.2**	**20,397**	**8.2**
Arkansas	596	32.4	556	44.8	672	16.4	664	28.3	1,644	8.0	1,620	14.6
Louisiana	319	7.8	288	11.5	748	4.0	748	6.1	2,083	3.8	2,053	6.8
Missouri	2,532	12.9	2,393	16.0	2,037	11.6	2,021	15.0	5,332	5.0	4,860	8.1
New Mexico	1,331	13.7	1,189	20.9	1,095	13.1	1,072	20.9	2,730	10.1	2,404	15.8
Oklahoma	1,628	9.9	1,600	13.7	1,340	10.9	1,340	16.6	2,714	4.3	2,645	8.8
Texas	1,909	11.8	1,834	14.9	3,666	6.4	3,638	8.4	6,875	3.4	6,815	4.2
Rocky Mountain	**17,435**	**15.3**	**16,211**	**22.7**	**6,434**	**16.6**	**6,164**	**25.3**	**16,376**	**9.6**	**14,440**	**17.1**
Arizona	2,709	17.6	2,548	28.5	745	18.8	733	28.4	3,571	7.4	2,818	15.3
Colorado	3,872	13.4	3,609	19.8	1,255	16.9	1,211	26.7	1,964	12.3	1,922	23.1
Kansas	1,316	12.8	1,289	14.0	553	9.8	544	12.5	1,293	6.3	1,206	8.2
Montana	1,915	10.8	1,568	17.6	842	20.3	733	31.2	1,497	10.9	1,370	19.8
Nebraska	54	5.6	53	5.7	260	2.7	257	4.7	571	3.0	561	3.7
Nevada	1,357	25.9	1,331	33.1	1,073	19.9	1,053	31.1	2,340	12.4	2,020	23.2
North Dakota	194	12.9	194	18.6	72	1.4	72	11.1	321	5.6	318	12.3
South Dakota	1,814	14.4	1,698	24.5	356	9.8	321	14.6	1,258	6.7	1,000	12.7
Utah	2,433	16.2	2,165	19.5	957	19.2	919	29.4	2,227	10.3	1,966	20.4
Wyoming	1,771	15.2	1,756	26.1	321	15.0	321	20.9	1,334	13.3	1,259	13.4
Western	**5,217**	**13.8**	**4,937**	**21.8**	**4,639**	**11.8**	**4,519**	**19.1**	**12,463**	**5.2**	**11,996**	**8.9**
Alaska	93	20.4	91	27.5	88	10.2	56	25.0	568	3.7	424	11.3
California	2,511	15.1	2,482	26.5	2,571	11.8	2,513	21.2	4,565	6.7	4,456	11.1
Hawaii	11	0.0	11	0.0	57	3.5	57	1.8	263	1.1	257	0.8
Idaho	1,230	16.4	1,034	23.4	590	15.9	560	26.1	2,013	7.3	1,877	15.3
Oregon	422	4.3	422	6.4	705	7.4	705	7.9	2,384	1.9	2,369	1.8
Pacific Island Possession	0	-	0	-	0	-	0	-	0	-	0	-
Panama Canal Zone	0	-	0	-	0	-	0	-	0	-	0	-
Washington	950	10.6	897	13.8	628	13.7	628	18.0	2,670	4.7	2,613	7.5
TOTAL	**71,409**	**11.9**	**66,388**	**17.6**	**46,101**	**10.8**	**44,792**	**16.2**	**112,689**	**5.9**	**107,115**	**10.3**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit MSHA - Mine Safety and Health Administration
NOTE: See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data.

Table 6-19 (page 1 of 3). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

	1979–1988				1989–1992 OSHA PEL: see note				1993–2003			
OSHA Region	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
Region 1	**4,622**	**8.2**	**3,421**	**19.8**	**2,509**	**2.3**	**1,627**	**3.8**	**3,294**	**5.1**	**2,696**	**7.8**
Connecticut	1,273	6.7	1,064	16.5	842	2.3	594	2.5	1,242	1.0	1,130	2.2
Maine	181	14.9	135	23.0	90	0.0	58	0.0	114	10.5	68	5.9
Massachusetts	1,876	8.0	1,281	21.6	1,259	2.3	754	4.2	1,398	7.2	1,066	12.3
New Hampshire	614	6.5	438	21.7	278	1.8	194	5.7	474	5.1	349	7.7
Rhode Island	677	11.5	502	19.9	38	10.5	26	15.4	65	29.2	83	28.9
Vermont	1	0.0	1	0.0	2	0.0	1	0.0	1	0.0	0	-
Region 2	**4,496**	**10.2**	**3,620**	**21.2**	**2,378**	**3.7**	**1,669**	**8.5**	**4,551**	**7.4**	**3,212**	**11.6**
New Jersey	1,560	12.5	1,218	25.0	867	5.2	577	12.5	1,260	4.9	839	5.7
New York	2,864	9.1	2,338	19.5	1,420	3.0	1,012	6.7	3,241	8.5	2,326	13.8
Puerto Rico	67	4.5	59	11.9	66	0.0	58	0.0	47	2.1	44	4.5
Virgin Islands	5	0.0	5	0.0	25	8.0	22	9.1	3	0.0	3	0.0
Region 3	**6,498**	**12.2**	**4,588**	**29.5**	**1,748**	**15.5**	**1,068**	**23.3**	**2,475**	**10.5**	**1,699**	**17.8**
Delaware	145	4.8	71	14.1	3	0.0	3	0.0	17	11.8	13	15.4
District of Columbia	127	0.8	121	9.9	20	10.0	14	0.0	22	9.1	12	0.0
Maryland	500	9.2	298	19.5	313	12.1	135	25.9	326	5.8	164	10.4
Pennsylvania	4,091	13.1	2,977	31.5	1,087	15.1	697	21.5	1,755	12.5	1,209	21.3
Virginia	805	13.2	613	32.8	160	31.9	114	44.7	238	4.2	236	8.5
West Virginia	830	11.9	508	27.0	165	9.7	105	12.4	117	6.0	65	9.2
Region 4	**6,557**	**11.2**	**4,700**	**22.9**	**4,343**	**6.2**	**2,787**	**11.4**	**6,670**	**5.4**	**4,903**	**10.7**
Alabama	1,070	15.0	743	28.5	662	9.7	442	24.2	806	3.2	531	5.6
Florida	628	4.6	411	10.7	510	2.0	340	2.4	430	4.4	388	6.4
Georgia	1,908	13.9	1,403	25.8	1,179	3.5	751	7.1	1,249	6.2	892	13.5
Kentucky	667	9.0	511	16.2	405	8.6	272	11.0	929	4.7	651	6.3
Mississippi	294	10.2	197	29.9	274	2.2	178	2.8	243	3.7	194	6.7
North Carolina	775	11.4	623	26.8	519	11.4	387	18.1	1,893	6.0	1,360	12.4
South Carolina	782	5.2	513	12.1	511	6.7	258	10.9	747	5.0	577	9.7
Tennessee	433	14.1	299	29.8	283	7.8	159	10.1	373	9.7	310	22.6

See footnotes at end of table.

Table 6-19 (page 2 of 3). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

OSHA Region	1979–1988				1989–1992 OSHA PELs changed. See note.				1993–2003			
	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
Region 5	**13,154**	**9.6**	**8,281**	**22.5**	**9,202**	**5.6**	**5,233**	**10.0**	**13,823**	**4.8**	**8,846**	**9.4**
Illinois	3,268	7.4	2,067	15.8	2,264	4.7	1,195	6.6	4,726	3.3	3,275	5.8
Indiana	931	12.6	591	36.0	318	3.5	219	10.0	673	7.9	471	13.8
Michigan	274	0.4	183	1.1	1,291	5.0	801	5.9	2,829	2.5	1,524	7.9
Minnesota	144	22.9	107	43.9	124	0.8	85	4.7	47	4.3	42	4.8
Ohio	5,503	9.4	3,384	21.9	2,599	5.2	1,606	10.2	2,252	7.7	1,414	14.1
Wisconsin	3,034	11.9	1,949	27.3	2,606	7.6	1,327	15.4	3,296	6.3	2,120	12.0
Region 6	**6,296**	**6.9**	**3,680**	**15.7**	**2,355**	**4.2**	**1,370**	**9.1**	**2,580**	**5.0**	**1,887**	**7.6**
Arkansas	604	7.8	328	14.6	171	8.8	117	13.7	330	6.1	357	6.4
Louisiana	449	7.6	265	19.2	190	2.1	87	4.6	55	14.5	41	29.3
New Mexico	22	27.3	17	35.3	18	0.0	18	0.0	58	20.7	53	22.6
Oklahoma	1,698	3.5	877	9.9	447	2.2	245	3.3	440	6.1	345	11.0
Texas	3,523	8.1	2,193	17.6	1,529	4.6	903	10.7	1,697	3.7	1,091	5.3
Region 7	**4,019**	**7.0**	**2,521**	**16.1**	**1,600**	**6.3**	**984**	**7.5**	**2,028**	**7.1**	**1,446**	**10.9**
Iowa	1,553	7.1	873	16.6	569	7.0	329	10.3	484	12.8	265	25.7
Kansas	715	7.1	430	17.9	304	4.6	202	9.4	981	6.2	821	9.6
Missouri	1,247	7.8	921	16.5	590	5.3	359	5.0	246	6.9	186	3.2
Nebraska	504	4.6	297	11.1	137	10.9	94	3.2	317	1.6	174	2.3
Region 8	**4,174**	**4.3**	**2,366**	**10.8**	**1,657**	**5.4**	**840**	**6.4**	**2,156**	**5.8**	**1,383**	**10.9**
Colorado	2,406	4.4	1,296	11.0	1,066	3.1	600	4.5	1,003	5.0	629	11.9
Montana	704	3.0	458	11.4	250	13.6	109	9.2	248	7.7	149	11.4
North Dakota	455	4.8	236	12.3	71	4.2	29	3.4	231	13.9	135	26.7
South Dakota	491	2.4	277	4.7	200	8.5	51	13.7	457	4.4	294	6.5
Utah	88	21.6	72	25.0	54	3.7	44	20.5	120	3.3	74	5.4
Wyoming	30	0.0	27	3.7	16	0.0	7	0.0	97	0.0	102	0.0

See footnotes at end of table.

Table 6-19 (page 3 of 3). Pneumoconiotic agents: Percent of exposures exceeding designated occupational exposure limits by OSHA region and state, OSHA samples, 1979–2003

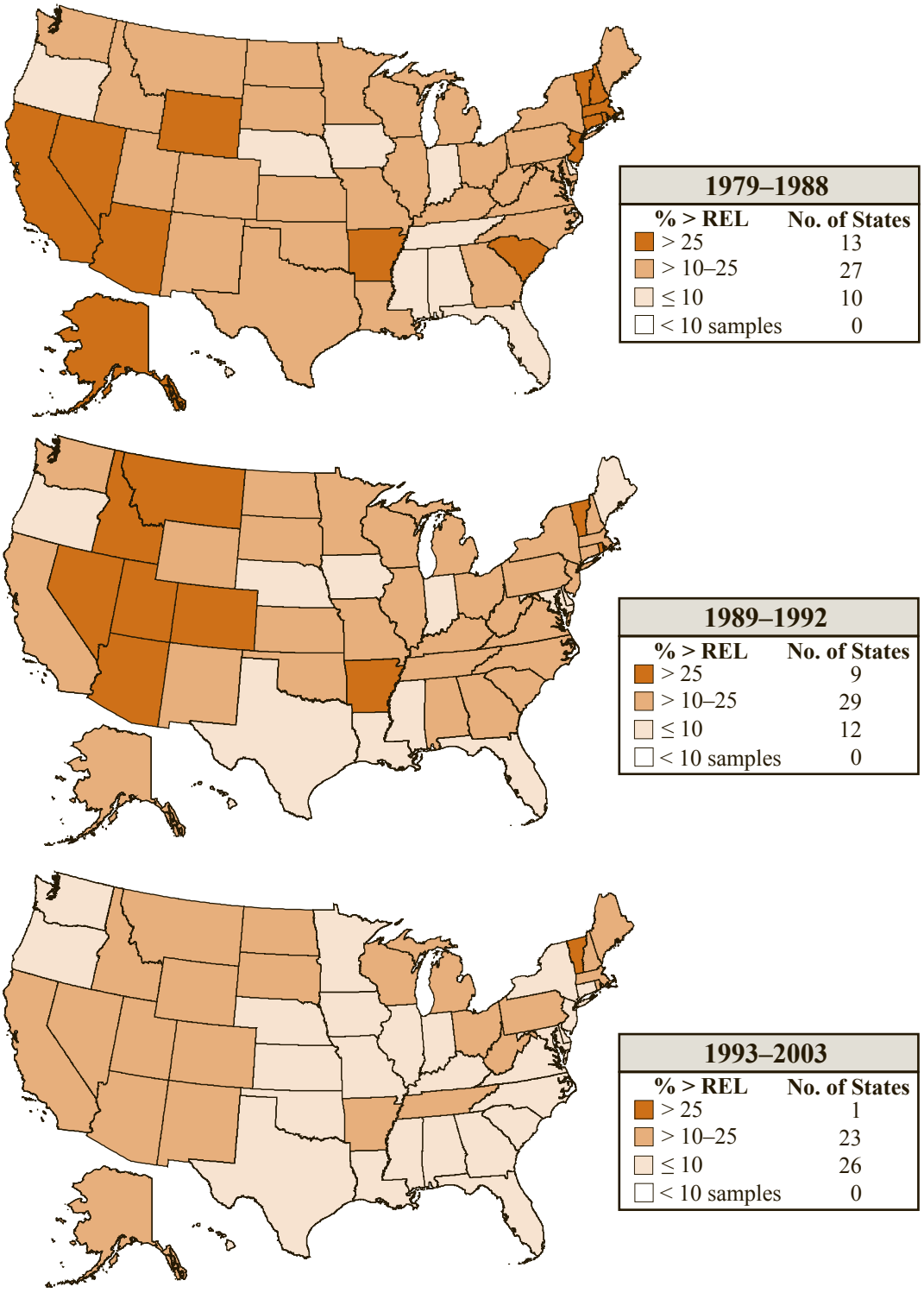
OSHA Region	1979–1988				1989–1992 OSHA PELs changed. See note.				1993–2003			
	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL	No. of Samples with PEL	% > PEL	No. of Samples with REL	% > REL
Region 9	**1,735**	**8.3**	**1,167**	**15.9**	**777**	**5.9**	**639**	**7.5**	**608**	**10.0**	**656**	**12.2**
American Samoa	0	-	0	-	0	-	0	-	0	-	0	-
Arizona	160	9.4	124	18.5	103	1.9	68	4.4	102	18.6	73	31.5
California	1,319	4.0	834	9.4	510	3.7	442	4.8	443	7.9	519	9.6
Guam	7	0.0	6	0.0	0	-	0	-	0	-	0	-
Hawaii	49	0.0	46	2.2	10	0.0	10	0.0	30	13.3	25	16.0
Nevada	200	38.0	157	53.5	154	16.2	119	20.2	33	9.1	39	7.7
Region 10	**895**	**8.2**	**628**	**17.8**	**644**	**9.9**	**381**	**9.2**	**1,404**	**11.6**	**1,075**	**22.0**
Alaska	194	2.1	178	3.4	47	6.4	42	9.5	34	0.0	32	0.0
Idaho	225	4.0	145	11.0	308	2.6	182	4.9	196	0.0	116	0.0
Oregon	448	11.6	296	28.7	63	9.5	32	6.3	616	8.8	378	17.2
Washington	28	28.6	9	55.6	226	20.8	125	16.0	558	19.5	549	31.1
TOTAL	**52,446**	**9.0**	**34,972**	**20.8**	**27,213**	**5.9**	**16,598**	**9.8**	**39,589**	**6.1**	**27,803**	**10.8**

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit OSHA - Occupational Safety and Health Administration

NOTE: From March 1, 1989 to March 22, 1993, the OSHA PELs in force differed from those employed before and after those dates. See appendices for source description, methods, and agents.

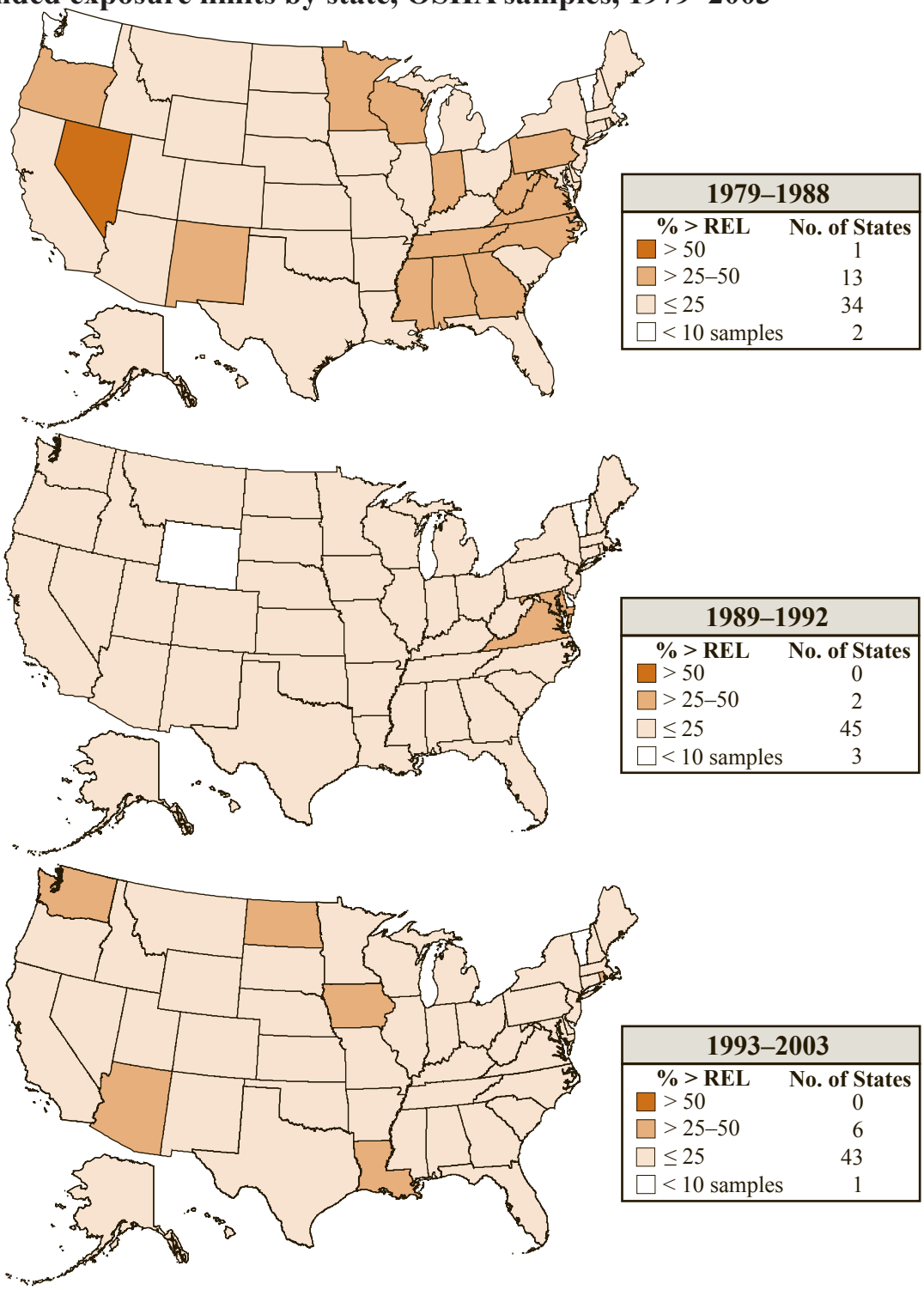
SOURCE: OSHA Integrated Management Information System.

Figure 6-5 Pneumoconiotic agents: Percent of exposures exceeding the NIOSH recommended exposure limits by state, MSHA metal/nonmetal mine samples, 1979–2003



REL - recommended exposure limit MSHA - Mine Safety and Health Administration
NOTE: See appendices for source description, methods, and agents.
SOURCE: MSHA metal/nonmetal mine data

Figure 6-6. Pneumoconiotic agents: Percent of exposures exceeding the NIOSH recommended exposure limits by state, OSHA samples, 1979–2003



REL - recommended exposure limit PEL - permissible exposure limit OSHA - Occupational Safety and Health Administration

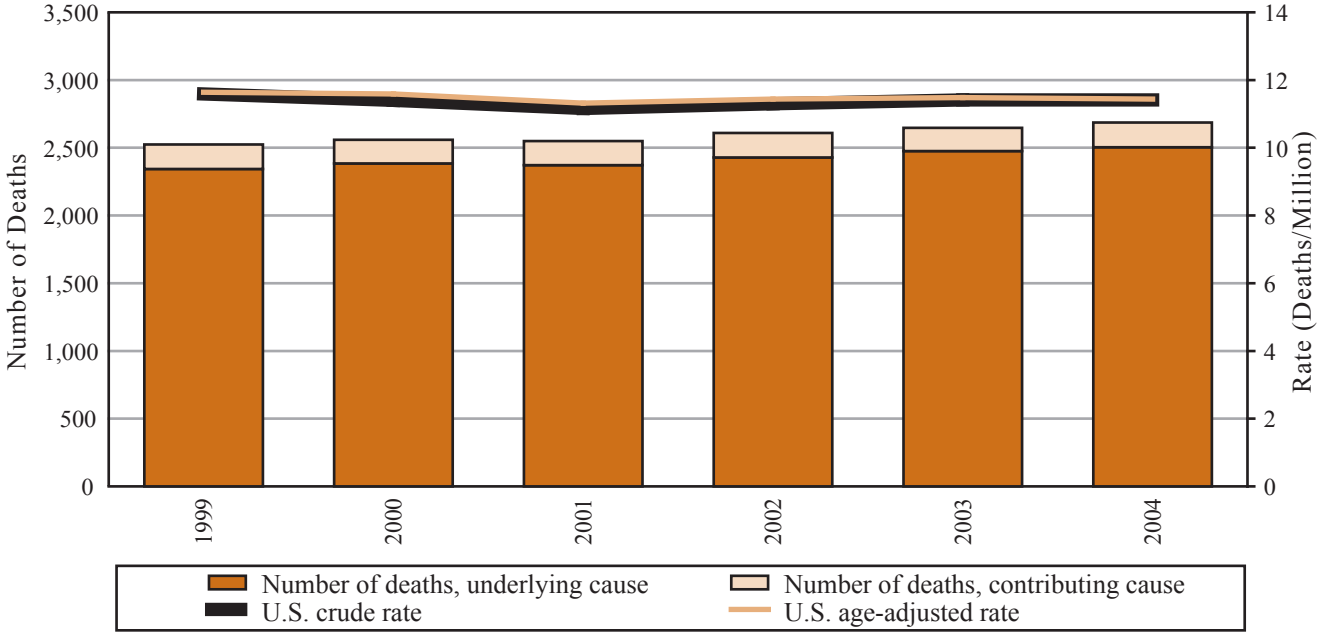
NOTE: From March 1, 1989 to March 22, 1993, many OSHA PELs in force differed from those employed before and after those dates. See appendices for source description, methods, and agents.

SOURCE: OSHA Integrated Management Information System.

Section 7

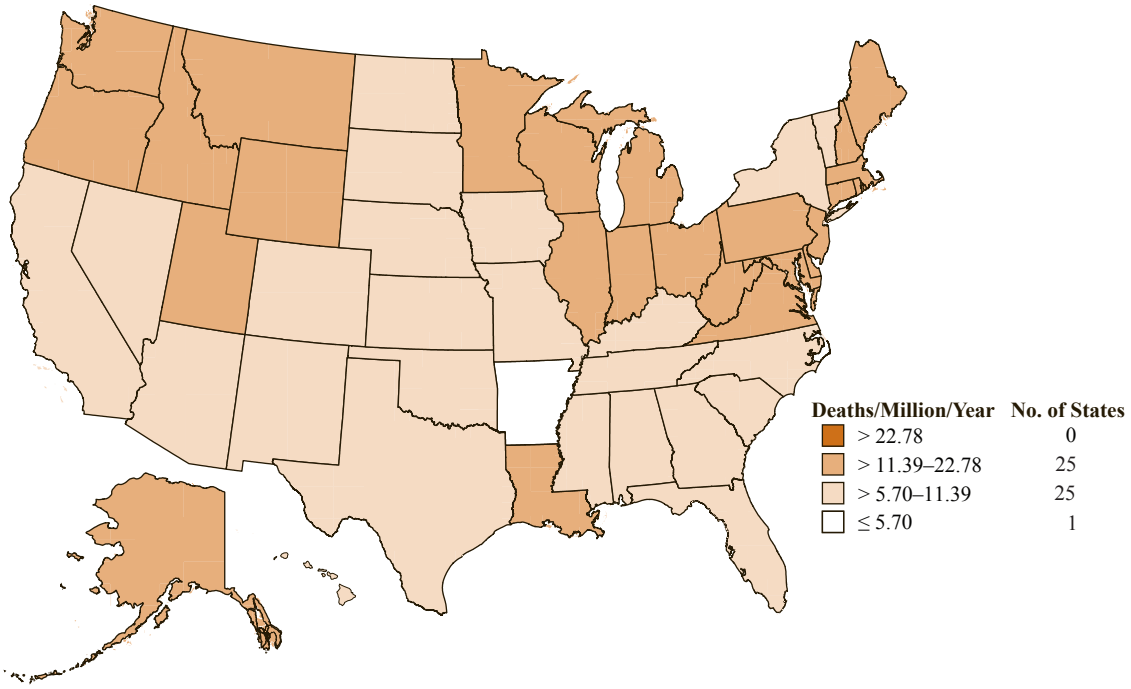
Malignant Mesothelioma

Figure 7-1. Malignant mesothelioma: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1999–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 7-2. Malignant mesothelioma: Age-adjusted death rates by state, U.S. residents age 15 and over, 1999–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 7-1. Malignant mesothelioma: Number of deaths by sex, race, age, median age at death, and anatomical site, U.S. residents age 15 and over, 1999–2004

Year	Anatomical Site	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
				Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1999	Pleura	252	90.1	219	33	240	10	2	-	-	2	12	32	101	86	19	72
	Peritoneum	92	90.2	62	30	90	2	-	-	-	2	10	23	31	20	6	70
	Other Sites	427	90.4	345	82	407	14	6	1	2	3	23	61	134	154	49	74
	Unspecified	1,751	94.1	1,402	349	1,652	82	17	1	2	26	94	276	566	644	142	73
	Any Site	**2,484**	**94.3**	**1,994**	**490**	**2,354**	**105**	**25**	**2**	**4**	**33**	**138**	**388**	**818**	**888**	**213**	**73**
2000	Pleura	225	87.1	188	37	215	7	3	-	-	3	6	45	79	78	14	73
	Peritoneum	84	91.7	44	40	75	9	-	-	3	3	12	11	32	21	2	68
	Other Sites	434	91.9	345	89	412	20	2	1	-	3	22	58	145	155	50	74
	Unspecified	1,817	94.2	1,487	330	1,726	73	18	-	3	25	93	264	566	674	192	74
	Any Site	**2,531**	**94.2**	**2,043**	**488**	**2,399**	**109**	**23**	**1**	**6**	**34**	**131**	**372**	**814**	**918**	**255**	**74**
2001	Pleura	269	90.0	217	52	261	5	3	-	-	1	10	45	75	109	29	75
	Peritoneum	85	88.2	57	28	81	2	2	2	3	2	10	21	30	15	2	66
	Other Sites	389	90.2	310	79	381	8	-	1	1	4	19	52	116	148	48	75
	Unspecified	1,807	94.2	1,472	335	1,726	60	21	1	3	32	109	252	536	687	187	74
	Any Site	**2,509**	**94.5**	**2,021**	**488**	**2,408**	**75**	**26**	**4**	**7**	**39**	**144**	**361**	**748**	**942**	**264**	**74**
2002	Pleura	238	91.2	195	43	228	7	3	-	-	5	12	37	85	80	19	72
	Peritoneum	95	82.1	53	42	92	3	-	-	1	4	12	20	32	23	3	69
	Other Sites	379	91.6	306	73	362	13	4	2	2	9	9	56	119	140	42	74
	Unspecified	1,902	94.0	1,605	297	1,808	77	17	1	7	22	76	277	544	741	234	75
	Any Site	**2,573**	**94.4**	**2,126**	**447**	**2,449**	**100**	**24**	**3**	**10**	**40**	**106**	**380**	**764**	**975**	**295**	**74**
2003	Pleura	206	87.9	164	42	196	8	2	-	-	2	11	30	62	82	19	74
	Peritoneum	95	93.7	60	35	91	2	2	-	1	7	10	23	24	26	4	67
	Other Sites	330	90.3	271	59	311	14	5	1	2	4	14	40	96	131	42	75
	Unspecified	2,016	94.6	1,644	372	1,908	86	22	3	4	26	115	300	536	796	236	75
	Any Site	**2,625**	**94.3**	**2,125**	**500**	**2,484**	**110**	**31**	**4**	**7**	**38**	**148**	**386**	**715**	**1,028**	**299**	**75**
2004	Pleura	196	89.8	169	27	189	6	1	-	-	5	10	39	54	77	11	73
	Peritoneum	101	93.1	65	36	95	4	2	-	-	8	15	18	35	23	2	67
	Other Sites	326	96.3	265	61	312	8	6	-	1	6	10	48	76	141	44	76
	Unspecified	2,064	93.0	1,668	396	1,970	79	15	1	11	24	89	301	516	867	255	76
	Any Site	**2,657**	**94.2**	**2,141**	**516**	**2,536**	**97**	**24**	**1**	**11**	**42**	**121**	**400**	**674**	**1,097**	**311**	**75**
TOTAL	Pleura	1,386	89.4	1,152	234	1,329	43	14	-	-	18	61	228	456	512	111	73
	Peritoneum	552	89.9	341	211	524	22	6	2	8	26	69	116	184	128	19	68
	Other Sites	2,285	91.7	1,842	443	2,185	77	23	6	8	29	97	315	686	869	275	75
	Unspecified	11,357	94.0	9,278	2,079	10,790	457	110	7	30	155	576	1,670	3,264	4,409	1,246	74
	Any Site	**15,379**	**94.3**	**12,450**	**2,929**	**14,630**	**596**	**153**	**15**	**45**	**226**	**788**	**2,287**	**4,533**	**5,848**	**1,637**	**74**

- indicates no deaths listed.

NOTE: The sum of individual site death totals may be greater than the total number of deaths for "any site" because some decedents have more than one site of mesothelioma listed on their death certificates. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 7-2. Malignant mesothelioma: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1999–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1999	11.59	21.92	4.95	6.43	2.02	3.61	1.53
2000	11.40	21.65	4.87	6.84	1.67	3.07	1.01
2001	11.16	21.40	4.92	4.66	1.10	3.66	0.81
2002	11.30	22.09	4.39	6.28	1.28	2.86	1.09
2003	11.41	21.65	4.96	7.25	1.00	3.88	1.06
2004	11.41	21.82	5.06	5.99	1.11	2.66	1.03
1999–2004	**11.26**	**21.54**	**4.82**	**6.17**	**1.34**	**3.17**	**1.03**
			Age-Adjusted Death Rate				
1999	11.64	23.88	4.29	10.32	2.57	6.47	2.18
2000	11.59	24.22	4.20	10.96	2.02	5.44	1.30
2001	11.32	23.83	4.23	7.53	1.32	6.68	1.10
2002	11.44	24.54	3.73	10.61	1.56	5.11	1.31
2003	11.48	23.84	4.20	11.54	1.24	6.56	1.38
2004	11.44	23.95	4.30	10.19	1.27	4.71	1.27
1999–2004	**11.39**	**23.84**	**4.13**	**10.10**	**1.63**	**5.61**	**1.35**

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 7-3. Malignant mesothelioma: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1999–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1999	3,390	1,205	320	95	25	30	5,065
2000	3,065	1,340	260	110	75	80	4,930
2001	3,385	1,460	270	85	125	40	5,365
2002	3,450	1,055	295	110	15	50	4,975
2003	3,505	1,325	520	30	85	60	5,525
2004	3,445	1,365	275	125	45	40	5,295
TOTAL	**20,240**	**7,750**	**1,940**	**555**	**370**	**300**	**31,155**
	Years of Potential Life Lost to Life Expectancy						
1999	23,515	7,120	1,060	408	230	132	32,465
2000	23,502	7,137	1,137	407	295	159	32,637
2001	23,975	7,417	844	300	371	105	33,012
2002	24,937	6,346	1,074	341	231	155	33,084
2003	25,059	7,512	1,467	217	400	151	34,806
2004	25,452	7,813	1,075	344	254	141	35,079
TOTAL	**146,440**	**43,345**	**6,657**	**2,017**	**1,781**	**843**	**201,083**

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 7-4. Malignant mesothelioma: Number of deaths by state, U.S. residents age 15 and over, 1999–2004

State	1999	2000	2001	2002	2003	2004	Total
Alabama	33	29	24	39	41	26	**192**
Alaska	8	4	3	5	5	5	**30**
Arizona	32	39	42	39	43	38	**233**
Arkansas	15	11	10	14	10	17	**77**
California	259	263	235	244	259	248	**1,508**
Colorado	17	29	32	29	29	27	**163**
Connecticut	33	18	36	36	46	42	**211**
Delaware	12	10	12	8	9	14	**65**
District of Columbia	5	2	2	3	3	3	**18**
Florida	163	173	184	165	198	177	**1,060**
Georgia	30	41	40	34	35	39	**219**
Hawaii	5	4	14	8	8	6	**45**
Idaho	14	13	9	13	11	8	**68**
Illinois	128	129	124	126	120	125	**752**
Indiana	58	51	49	53	63	58	**332**
Iowa	21	23	24	37	20	26	**151**
Kansas	27	29	24	22	19	17	**138**
Kentucky	24	32	38	25	23	27	**169**
Louisiana	47	54	39	38	50	50	**278**
Maine	28	23	22	23	29	26	**151**
Maryland	51	53	55	49	49	63	**320**
Massachusetts	81	96	76	77	68	85	**483**
Michigan	69	107	93	93	100	96	**558**
Minnesota	61	59	45	49	72	59	**345**
Mississippi	20	7	18	20	21	14	**100**
Missouri	49	50	37	56	38	48	**278**
Montana	10	13	13	12	13	10	**71**
Nebraska	15	16	17	19	16	15	**98**
Nevada	22	12	13	19	16	17	**99**
New Hampshire	11	15	18	13	15	14	**86**
New Jersey	111	102	103	133	112	113	**674**
New Mexico	17	20	7	13	10	14	**81**
New York	156	136	161	159	138	143	**893**
North Carolina	56	49	46	52	61	61	**325**
North Dakota	4	3	10	10	7	4	**38**
Ohio	131	105	111	121	136	122	**726**
Oklahoma	22	26	19	21	28	25	**141**
Oregon	32	50	59	30	51	42	**264**
Pennsylvania	161	161	159	156	180	193	**1,010**
Rhode Island	14	9	10	15	11	8	**67**
South Carolina	26	42	28	26	30	25	**177**
South Dakota	4	8	5	4	7	6	**34**
Tennessee	31	34	44	49	32	46	**236**
Texas	125	119	129	127	135	155	**790**
Utah	9	20	13	23	10	18	**93**
Vermont	7	2	6	7	3	4	**29**
Virginia	75	79	72	75	70	85	**456**
Washington	72	76	77	84	77	80	**466**
West Virginia	29	18	25	26	21	30	**149**
Wisconsin	49	60	73	66	71	69	**388**
Wyoming	5	7	4	8	6	14	**44**
TOTAL	**2,484**	**2,531**	**2,509**	**2,573**	**2,625**	**2,657**	**15,379**

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 7-5. Malignant mesothelioma: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1999–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	192	25	8.97	39	8.74	41	2,785	25	14.5	16
Alaska	30	49	10.28	29	21.66	1	406	50	13.5	40
Arizona	233	22	9.22	37	8.98	40	3,156	23	13.5	40
Arkansas	77	40	5.97	50	5.55	51	1,268	38	16.5	2
California	1,508	1	9.25	36	10.53	29	21,437	1	14.2	24
Colorado	163	28	7.66	46	9.46	37	2,444	28	15.0	10
Connecticut	211	24	12.88	18	11.76	23	2,827	24	13.4	43
Delaware	65	44	16.67	5	16.57	5	811	44	12.5	50
District of Columbia	18	51	6.32	49	6.70	50	286	51	15.9	4
Florida	1,060	2	13.10	16	10.28	31	14,181	2	13.4	43
Georgia	219	23	5.48	51	6.87	49	3,296	22	15.0	10
Hawaii	45	45	7.52	47	7.07	48	622	46	13.8	31
Idaho	68	42	10.94	26	11.55	24	971	42	14.3	20
Illinois	752	6	12.69	20	13.19	18	10,605	6	14.1	26
Indiana	332	15	11.45	25	11.53	25	4,733	15	14.3	20
Iowa	151	29	10.64	28	9.50	35	2,163	30	14.3	20
Kansas	138	33	10.74	27	10.32	30	1,807	33	13.1	46
Kentucky	169	27	8.48	42	8.67	42	2,530	26	15.0	10
Louisiana	278	18	13.22	15	13.91	16	4,406	18	15.9	4
Maine	151	29	23.52	1	21.38	2	2,049	31	13.6	37
Maryland	320	17	12.38	21	13.41	17	4,522	17	14.1	26
Massachusetts	483	10	15.45	10	14.73	11	6,308	11	13.1	46
Michigan	558	9	11.74	24	11.85	21	7,986	9	14.3	20
Minnesota	345	14	14.40	12	14.86	9	4,680	16	13.6	37
Mississippi	100	34	7.44	48	7.67	47	1,555	34	15.5	6
Missouri	278	18	10.25	30	9.83	32	3,906	19	14.0	28
Montana	71	41	16.09	8	15.07	8	988	41	13.9	29
Nebraska	98	36	11.94	23	11.36	26	1,359	37	13.9	29
Nevada	99	35	9.77	31	10.83	28	1,504	35	15.2	8
New Hampshire	86	38	14.02	13	14.76	10	1,162	40	13.5	40
New Jersey	674	8	16.50	6	15.81	6	8,553	8	12.7	49
New Mexico	81	39	9.35	35	9.58	33	1,250	39	15.4	7
New York	893	4	9.72	32	9.57	34	12,261	4	13.7	33
North Carolina	325	16	8.23	44	8.56	44	4,820	14	14.8	13
North Dakota	38	47	12.28	22	11.06	27	546	47	14.4	19
Ohio	726	7	13.39	14	12.73	19	9,948	7	13.7	33
Oklahoma	141	32	8.48	42	8.21	46	2,048	32	14.5	16
Oregon	264	20	15.64	9	15.35	7	3,598	21	13.6	37
Pennsylvania	1,010	3	16.86	3	14.25	15	13,289	3	13.2	45
Rhode Island	67	43	12.81	19	11.80	22	916	43	13.7	33
South Carolina	177	26	8.95	40	9.25	39	2,446	27	13.8	31
South Dakota	34	48	9.41	34	8.37	45	424	49	12.5	50
Tennessee	236	21	8.50	41	8.59	43	3,782	20	16.0	3
Texas	790	5	7.89	45	9.47	36	11,538	5	14.6	14
Utah	93	37	9.02	38	11.98	20	1,414	36	15.2	8
Vermont	29	50	9.59	33	9.33	38	489	48	16.8	1
Virginia	456	12	13.08	17	14.42	14	6,459	10	14.2	24
Washington	466	11	16.12	7	17.52	4	6,061	12	13.0	48
West Virginia	149	31	16.74	4	14.56	13	2,181	29	14.6	14
Wisconsin	388	13	14.87	11	14.58	12	5,313	13	13.7	33
Wyoming	44	46	18.30	2	19.07	3	640	45	14.5	16

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 7-6. Malignant mesothelioma: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states, 1999

CIC	Industry	Number of Deaths	Percent
060	Construction	77	14.2
961	Non-paid worker or non-worker or own home/at home	38	7.0
842	Elementary and secondary schools	20	3.7
192	Industrial and miscellaneous chemicals	19	3.5
901	General government, n.e.c.	13	2.4
010	Agricultural production, crops	10	1.9
392	Not specified manufacturing industries	10	1.9
460	Electric light and power	10	1.9
400	Railroads	9	1.7
831	Hospitals	9	1.7
	All other industries	303	56.0
	Industry not reported	23	4.3
	TOTAL	**541**	**100.0**

CIC - Census Industry Code n.e.c. - not elsewhere classified
NOTE: The comparable number of malignant mesothelioma deaths in the entire United States for this same time period was 2,484. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 7-7. Malignant mesothelioma: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states, 1999

COC	Occupation	Number of Deaths	Percent
019	Managers and administrators, n.e.c.	41	7.6
914	Housewife/Homemaker	37	6.8
585	Plumbers, pipefitters, and steamfitters	18	3.3
453	Janitors and cleaners	17	3.1
243	Supervisors and proprietors, sales occupations	16	3.0
567	Carpenters	16	3.0
156	Teachers, elementary school	13	2.4
473	Farmers, except horticulture	12	2.2
575	Electricians	12	2.2
633	Supervisors, production occupations	12	2.2
804	Truck drivers	12	2.2
	All other occupations	307	56.8
	Occupation not reported	28	5.2
	TOTAL	**541**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of malignant mesothelioma deaths in the entire United States for this same time period was 2,484. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 7-8. Malignant mesothelioma: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states, 1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
360	Ship and boat building and repairing	7	6.0	2.4	12.3
192	Industrial and miscellaneous chemicals	19	4.8	2.9	7.5
200	Petroleum refining	5	3.8	1.2	8.9
460	Electric light and power	10	3.1	1.5	5.7
060	Construction	77	1.6	1.2	1.9

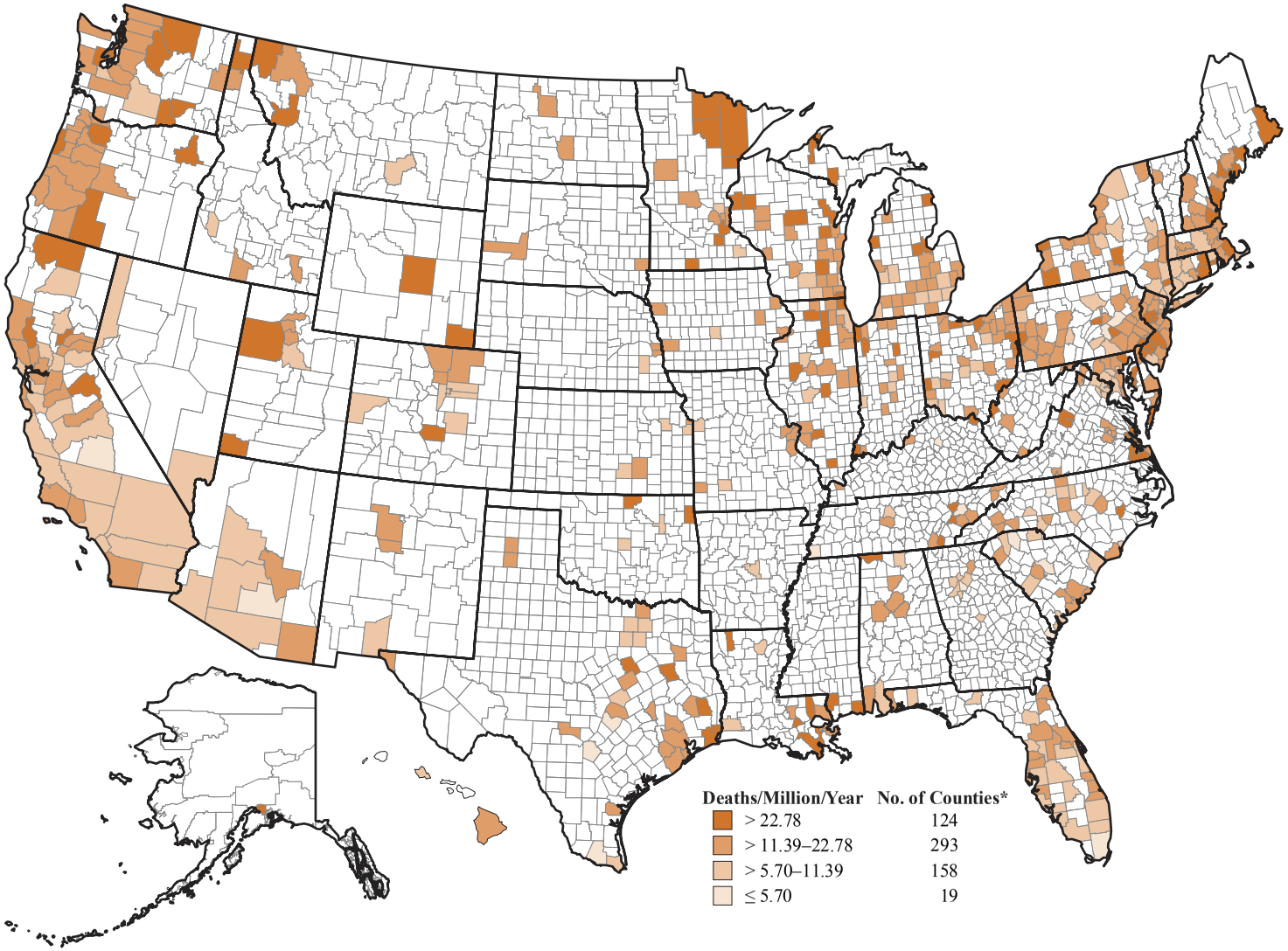
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with malignant mesothelioma reported was 541 in these same selected states and years, and the comparable number of malignant mesothelioma deaths in the entire United States for this same time period was 2,484. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 7-9. Malignant mesothelioma: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states, 1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
585	Plumbers, pipefitters, and steamfitters	18	4.8	2.8	7.5
057	Mechanical engineers	6	3.0	1.1	6.6
575	Electricians	12	2.4	1.3	4.2
156	Teachers, elementary school	13	2.1	1.1	3.6

COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with malignant mesothelioma reported was 541 in these same selected states and years, and the comparable number of malignant mesothelioma deaths in the entire United States for this same time period was 2,484. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 7-3. Malignant mesothelioma: Age-adjusted death rates by county, U.S. residents age 15 and over, 2000–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 7-10. Malignant mesothelioma: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 2000–2004

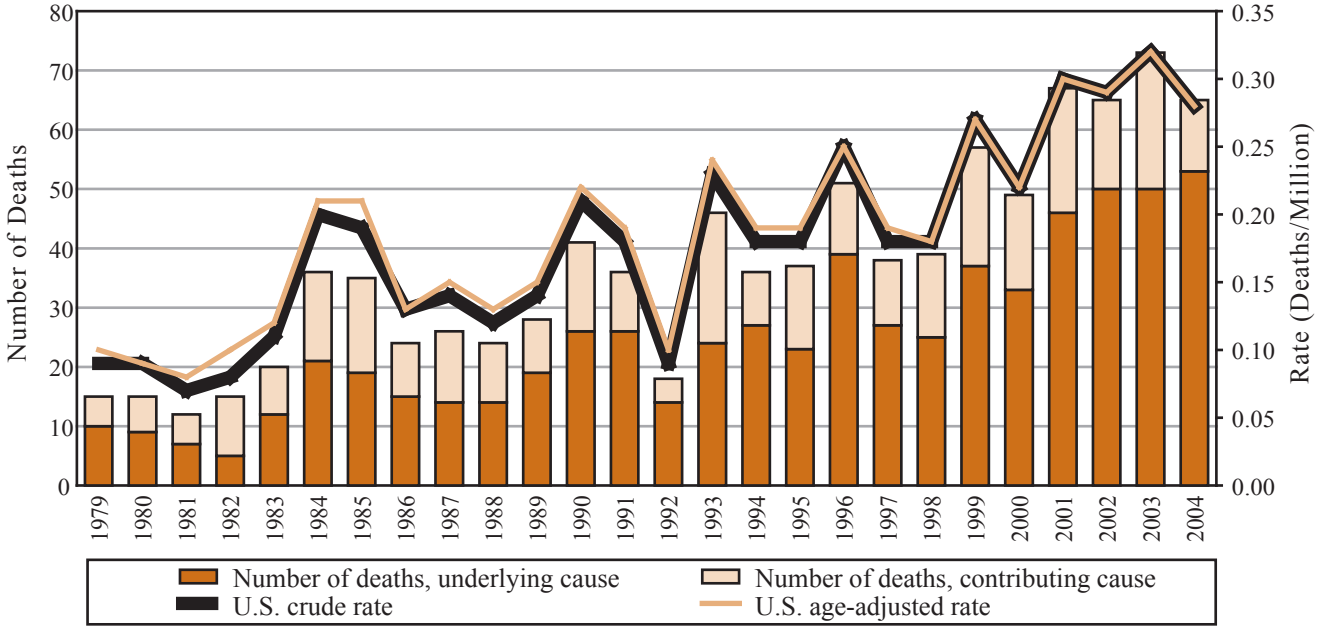
County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Sagadahoc County	Maine	97.1	102.6	15	26.7
Koochiching County	Minnesota	77.5	104.5	6	0.0
Lincoln County	Montana	56.1	65.1	5	40.0
Mason County	West Virginia	55.6	65.7	7	14.3
Carlton County	Minnesota	55.3	60.5	8	0.0
Lincoln County	Maine	55.0	76.0	11	9.1
Bonner County	Idaho	50.7	58.2	9	11.1
Washington County	Maine	50.3	64.7	9	11.1
Newport News City	Virginia	49.2	42.4	29	6.9
Kitsap County	Washington	48.0	43.1	40	20.0
Posey County	Indiana	47.8	46.9	5	60.0
York County	Virginia	47.2	38.8	9	11.1
Dickinson County	Michigan	47.0	63.1	7	28.6
Tooele County	Utah	46.9	36.3	6	16.7
Union County	Oregon	45.5	50.4	5	40.0
Tyler County	Texas	44.7	59.3	5	0.0
Jasper County	Indiana	43.3	41.5	5	40.0
Isle of Wight County	Virginia	42.8	40.1	5	20.0
Jefferson Parish	Louisiana	42.1	41.7	75	34.7
Somerset County	New Jersey	41.0	37.2	45	33.3
Portsmouth City	Virginia	40.5	43.6	17	29.4
Mason County	Washington	39.6	47.7	10	0.0
Martin County	Minnesota	38.6	57.5	5	0.0
Orange County	Texas	38.4	39.2	13	7.7
Hancock County	West Virginia	38.0	52.4	7	14.3
Houghton County	Michigan	37.7	40.3	6	50.0
Gloucester County	Virginia	37.5	35.0	5	0.0
Franklin County	Washington	37.4	26.2	5	20.0
Alpena County	Michigan	36.4	47.1	6	16.7
Delaware County	Oklahoma	35.7	45.8	7	28.6
Anchorage Borough	Alaska	35.6	13.7	14	0.0
Yuba County	California	34.8	30.2	7	28.6
Polk County	Wisconsin	34.8	40.7	7	0.0
Gloucester County	New Jersey	34.8	32.7	34	11.8
Kenosha County	Wisconsin	34.4	31.5	19	26.3
Niagara County	New York	34.3	40.9	36	16.7
Mason County	Michigan	34.2	42.8	5	20.0
Augusta County	Virginia	34.1	33.0	9	11.1
James City County	Virginia	33.8	42.6	9	22.2
Preble County	Ohio	33.6	35.3	6	50.0
Greenup County	Kentucky	33.4	39.5	6	33.3
Natrona County	Wyoming	32.9	33.5	9	0.0
Jackson County	Mississippi	32.5	27.0	14	21.4
Chesapeake City	Virginia	32.3	23.9	19	5.3
Clinton County	Illinois	32.2	34.7	5	40.0
Windham County	Connecticut	31.9	31.6	14	35.7
Hill County	Texas	31.7	37.4	5	20.0
Cattaraugus County	New York	31.5	35.9	12	25.0
Siskiyou County	California	31.3	44.2	8	12.5
St. Louis County	Minnesota	31.3	38.4	32	6.3
Overall United States		**11.5**	**11.3**	**12,895**	**18.9**

NOTE: Only counties with at least 5 deaths from the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Section 8

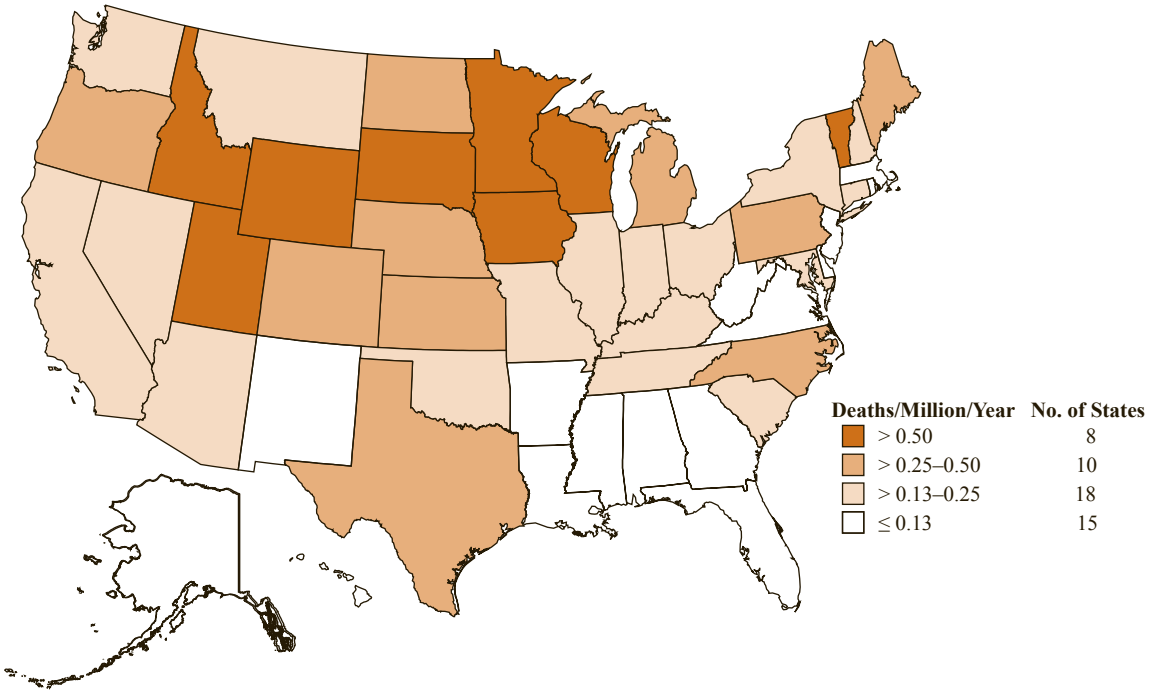
Hypersensitivity Pneumonitis

Figure 8-1. Hypersensitivity pneumonitis: Number of deaths, crude and age-adjusted death rates, U.S. residents age 15 and over, 1979–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 8-2. Hypersensitivity pneumonitis: Age-adjusted death rates by state, U.S. residents age 15 and over, 1995–2004



NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 8-1. Hypersensitivity pneumonitis: Number of deaths by sex, race, and age, and median age at death, U.S. residents age 15 and over, 1995–2004

Year	No. of Deaths	Underlying Cause (%)	Sex		Race			Age Group (yrs)								Median Age (yrs)
			Male	Female	White	Black	Other	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85+	
1995	37	62.2	24	13	32	5	-	-	1	-	6	4	7	14	5	75
1996	51	76.5	35	16	49	2	-	-	3	3	5	7	11	16	6	73
1997	38	71.1	25	13	38	-	-	-	-	1	2	6	8	14	7	76
1998	38	65.8	31	7	37	1	-	-	-	-	2	3	10	17	6	78
1999	57	64.9	36	21	56	1	-	-	3	2	9	5	11	19	8	74
2000	49	67.3	28	21	45	4	-	-	-	1	6	7	14	16	5	73
2001	67	68.7	47	20	65	2	-	-	1	4	4	5	18	24	11	75
2002	65	76.9	31	34	64	1	-	-	-	2	7	10	24	19	3	70
2003	73	68.5	40	33	67	2	4	1	1	2	6	13	14	27	9	74
2004	65	81.5	38	27	63	1	1	-	1	2	8	11	17	15	11	72
TOTAL	**540**	**70.9**	**335**	**205**	**516**	**19**	**5**	**1**	**10**	**17**	**55**	**71**	**134**	**181**	**71**	**73**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 8-2. Hypersensitivity pneumonitis: Death rates (per million population) by race and sex, U.S. residents age 15 and over, 1995–2004

		White		Black		Other	
Year	**Overall**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
			Crude Death Rate				
1995	0.18	0.26	0.11	0.18	0.23	-	-
1996	0.25	0.40	0.17	0.09	0.08	-	-
1997	0.18	0.29	0.14	-	-	-	-
1998	0.18	0.35	0.08	0.08	-	-	-
1999	0.27	0.40	0.23	0.08	-	-	-
2000	0.22	0.29	0.20	0.16	0.14	-	-
2001	0.30	0.51	0.20	0.08	0.07	-	-
2002	0.29	0.33	0.35	0.08	-	-	-
2003	0.32	0.41	0.30	-	0.13	0.32	0.30
2004	0.28	0.41	0.26	-	0.07	-	0.15
1995–2004	**0.24**	**0.36**	**0.20**	**0.07**	**0.07**	**0.04**	**0.05**
			Age-Adjusted Death Rate				
1995	0.19	0.33	0.10	0.31	0.28	-	-
1996	0.25	0.46	0.14	0.07	0.09	-	-
1997	0.19	0.35	0.12	-	-	-	-
1998	0.18	0.40	0.06	0.10	-	-	-
1999	0.27	0.46	0.20	0.10	-	-	-
2000	0.22	0.34	0.18	0.20	0.17	-	-
2001	0.30	0.60	0.18	0.08	0.09	-	-
2002	0.29	0.36	0.32	0.12	-	-	-
2003	0.32	0.47	0.26	-	0.15	0.71	0.41
2004	0.28	0.46	0.23	-	0.08	-	0.20
1995–2004	**0.25**	**0.42**	**0.18**	**0.09**	**0.08**	**0.09**	**0.07**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 8-3. Hypersensitivity pneumonitis: Years of potential life lost to age 65 and to life expectancy by race and sex, U.S. residents age 15 and over, 1995–2004

Year	White		Black		Other		Total
	Male	Female	Male	Female	Male	Female	
	Years of Potential Life Lost to Age 65						
1995	85	35	-	25	-	-	145
1996	190	65	35	-	-	-	290
1997	40	45	-	-	-	-	85
1998	30	-	15	-	-	-	45
1999	190	110	15	-	-	-	315
2000	50	70	25	5	-	-	150
2001	105	90	25	-	-	-	220
2002	55	150	-	-	-	-	205
2003	150	120	-	10	-	5	285
2004	135	125	-	-	-	-	260
TOTAL	**1,030**	**810**	**115**	**40**	**-**	**5**	**2,000**
	Years of Potential Life Lost to Life Expectancy						
1995	280	162	18	70	-	-	530
1996	542	242	39	14	-	-	837
1997	283	202	-	-	-	-	485
1998	311	78	24	-	-	-	413
1999	531	387	24	-	-	-	942
2000	305	338	44	35	-	-	722
2001	535	358	33	15	-	-	941
2002	382	657	12	-	-	-	1,051
2003	524	542	-	44	18	31	1,159
2004	539	508	-	15	-	15	1,077
TOTAL	**4,232**	**3,474**	**194**	**193**	**18**	**46**	**8,157**

- indicates no deaths listed.
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 8-4. Hypersensitivity pneumonitis: Number of deaths by state, U.S. residents age 15 and over, 1995–2004

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Alabama	-	-	1	-	-	1	1	-	-	1	**4**
Alaska	-	-	-	-	-	-	-	-	-	-	**-**
Arizona	-	1	2	-	-	-	-	1	2	1	**7**
Arkansas	-	-	-	-	-	-	1	-	-	-	**1**
California	2	7	7	4	6	2	5	11	8	3	**55**
Colorado	1	-	1	-	1	1	2	2	-	-	**8**
Connecticut	-	1	1	-	1	2	-	1	-	-	**6**
Delaware	-	-	-	-	-	-	-	-	-	-	**-**
District of Columbia	-	-	-	-	-	1	-	-	-	-	**1**
Florida	1	2	1	1	2	3	2	3	4	-	**19**
Georgia	-	-	-	1	-	-	-	-	-	-	**1**
Hawaii	-	-	-	-	-	-	-	-	-	-	**-**
Idaho	-	-	-	4	-	-	2	1	1	1	**9**
Illinois	2	1	-	2	3	4	-	2	2	2	**18**
Indiana	1	1	1	-	2	-	-	1	1	1	**8**
Iowa	3	2	3	7	2	1	3	1	-	3	**25**
Kansas	1	2	-	-	2	1	1	-	1	1	**9**
Kentucky	1	-	-	-	-	-	-	2	2	-	**5**
Louisiana	-	2	-	-	-	-	-	1	1	-	**4**
Maine	-	1	1	-	1	-	-	1	-	1	**5**
Maryland	1	-	-	-	1	-	-	1	2	2	**7**
Massachusetts	-	-	-	-	-	2	-	1	2	2	**7**
Michigan	2	2	2	2	3	3	4	2	2	2	**24**
Minnesota	1	2	1	1	3	2	4	5	4	2	**25**
Mississippi	-	-	-	-	-	1	-	-	-	1	**2**
Missouri	-	2	-	-	2	2	1	1	1	-	**9**
Montana	-	1	-	-	-	-	-	-	-	-	**1**
Nebraska	-	2	-	-	1	-	1	2	-	-	**6**
Nevada	-	-	-	-	-	-	-	-	-	2	**2**
New Hampshire	1	-	-	1	-	-	-	-	-	-	**2**
New Jersey	-	1	-	-	2	1	-	1	-	1	**6**
New Mexico	-	-	-	-	-	1	-	-	-	-	**1**
New York	3	3	1	-	3	3	11	2	6	4	**36**
North Carolina	1	1	4	1	-	2	-	1	3	5	**18**
North Dakota	-	-	1	-	-	2	-	-	-	-	**3**
Ohio	2	2	-	2	3	1	4	3	2	2	**21**
Oklahoma	-	-	-	-	-	1	-	2	1	-	**4**
Oregon	2	-	2	2	-	1	3	-	1	2	**13**
Pennsylvania	4	4	1	3	1	2	1	3	3	8	**30**
Rhode Island	-	-	-	-	-	-	-	-	1	-	**1**
South Carolina	1	1	-	1	1	-	-	-	2	-	**6**
South Dakota	-	-	-	2	-	1	1	-	-	-	**4**
Tennessee	-	1	-	-	-	-	3	1	2	1	**8**
Texas	2	1	1	1	5	3	6	5	6	5	**35**
Utah	-	-	-	1	2	2	-	3	-	-	**8**
Vermont	-	-	-	-	-	-	1	1	2	1	**5**
Virginia	-	1	-	-	1	-	1	-	-	-	**3**
Washington	2	-	1	-	-	-	1	-	3	-	**7**
West Virginia	-	1	-	-	-	-	-	1	-	-	**2**
Wisconsin	3	6	6	2	7	2	8	3	7	11	**55**
Wyoming	-	-	-	-	2	1	-	-	1	-	**4**
TOTAL	**37**	**51**	**38**	**38**	**57**	**49**	**67**	**65**	**73**	**65**	**540**

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes. SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 8-5. Hypersensitivity pneumonitis: Number of deaths, death rates (per million population), and years of potential life lost (YPLL) by state, U.S. residents age 15 and over, 1995–2004

State	No. of Deaths	Rank	Death Rate				YPLL to Life Expectancy			
			Crude	Rank	Age-Adjusted	Rank	Total	Rank	YPLL/death	Rank
Alabama	4	32	0.11	41	0.11	41	60	33	15.1	22
Alaska	-	-	-	-	-	-	-	-	-	-
Arizona	7	21	0.18	27	0.17	30	152	16	21.7	5
Arkansas	1	43	0.05	46	0.04	47	15	43	14.6	26
California	55	1	0.21	22	0.23	19	1,005	1	18.3	12
Colorado	8	17	0.24	17	0.27	16	149	17	18.7	11
Connecticut	6	25	0.22	20	0.21	23	127	21	21.2	7
Delaware	-	-	-	-	-	-	-	-	-	-
District of Columbia	1	43	0.21	22	0.23	19	9	46	8.6	46
Florida	19	10	0.15	32	0.12	38	276	10	14.5	27
Georgia	1	43	0.02	48	0.02	48	9	46	8.6	46
Hawaii	-	-	-	-	-	-	-	-	-	-
Idaho	9	14	0.91	5	0.97	4	129	20	14.3	29
Illinois	18	11	0.18	27	0.19	27	242	11	13.4	35
Indiana	8	17	0.17	30	0.17	30	114	24	14.2	30
Iowa	25	6	1.07	2	0.91	5	284	9	11.4	39
Kansas	9	14	0.43	13	0.43	12	187	13	20.8	8
Kentucky	5	29	0.15	32	0.15	34	115	23	23.1	3
Louisiana	4	32	0.11	41	0.12	38	96	27	24.1	2
Maine	5	29	0.48	9	0.44	11	61	32	12.2	37
Maryland	7	21	0.17	30	0.18	28	116	22	16.6	18
Massachusetts	7	21	0.14	36	0.13	36	72	30	10.2	44
Michigan	24	8	0.31	14	0.31	14	337	7	14.0	33
Minnesota	25	6	0.64	7	0.64	6	300	8	12.0	38
Mississippi	2	39	0.09	43	0.09	43	45	38	22.7	4
Missouri	9	14	0.20	24	0.20	25	139	19	15.4	21
Montana	1	43	0.14	36	0.13	36	8	48	8.4	48
Nebraska	6	25	0.44	12	0.42	13	82	28	13.7	34
Nevada	2	39	0.13	39	0.17	30	56	35	28.1	1
New Hampshire	2	39	0.20	24	0.21	23	28	41	14.2	30
New Jersey	6	25	0.09	43	0.09	43	100	26	16.7	17
New Mexico	1	43	0.07	45	0.07	45	14	45	14.4	28
New York	36	3	0.24	17	0.23	19	512	5	14.2	30
North Carolina	18	11	0.28	16	0.30	15	242	11	13.4	35
North Dakota	3	37	0.58	8	0.45	10	27	42	9.0	45
Ohio	21	9	0.23	19	0.23	19	378	6	18.0	13
Oklahoma	4	32	0.15	32	0.14	35	68	31	17.1	16
Oregon	13	13	0.48	9	0.46	9	145	18	11.2	40
Pennsylvania	30	5	0.30	15	0.27	16	538	4	17.9	14
Rhode Island	1	43	0.12	40	0.11	41	15	43	14.9	23
South Carolina	6	25	0.19	26	0.20	25	105	25	17.5	15
South Dakota	4	32	0.67	6	0.60	8	60	33	14.9	23
Tennessee	8	17	0.18	27	0.18	28	166	14	20.8	8
Texas	35	4	0.22	20	0.26	18	573	3	16.4	19
Utah	8	17	0.48	9	0.63	7	159	15	19.9	10
Vermont	5	29	1.01	4	1.03	3	54	36	10.8	43
Virginia	3	37	0.05	46	0.06	46	47	37	15.7	20
Washington	7	21	0.15	32	0.16	33	78	29	11.1	41
West Virginia	2	39	0.14	36	0.12	38	43	40	21.6	6
Wisconsin	55	1	1.29	1	1.25	1	810	2	14.7	25
Wyoming	4	32	1.02	3	1.12	2	44	39	11.0	42

- indicates no deaths listed. NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 8-6. Hypersensitivity pneumonitis: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	Percent
011	Agricultural production, livestock	30	24.6
010	Agricultural production, crops	22	18.0
961	Non-paid worker or non-worker or own home/at home	13	10.7
060	Construction	4	3.3
410	Trucking service	4	3.3
831	Hospitals	4	3.3
142	Yarn, thread, and fabric mills	3	2.5
630	Apparel and accessory stores, except shoe	3	2.5
601	Grocery stores	2	1.6
842	Elementary and secondary schools	2	1.6
850	Colleges and universities	2	1.6
942	Military	2	1.6
	All other industries	23	18.9
	Industry not reported	8	6.6
	TOTAL	**122**	**100.0**

CIC - Census Industry Code
NOTE: The comparable number of hypersensitivity pneumonitis deaths in the entire United States for this same time period was 398. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 8-7. Hypersensitivity pneumonitis: Most frequently recorded occupations on death certificate, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	Percent
473	Farmers, except horticulture	51	41.8
914	Housewife/Homemaker	12	9.8
019	Managers and administrators, n.e.c.	4	3.3
633	Supervisors, production occupations	3	2.5
804	Truck drivers	3	2.5
095	Registered nurses	2	1.6
243	Supervisors and proprietors, sales occupations	2	1.6
637	Machinists	2	1.6
889	Laborers, except construction	2	1.6
905	Military occupations	2	1.6
	All other occupations	32	26.2
	Occupation not reported	7	5.7
	TOTAL	**122**	**100.0**

COC - Census Occupation Code n.e.c. - not elsewhere classified
NOTE: The comparable number of hypersensitivity pneumonitis deaths in the entire United States for this same time period was 398. Percentages may not total to 100% due to rounding. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 8-8. Hypersensitivity pneumonitis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
011	Agricultural production, livestock	30	17.6	11.9	25.2
010	Agricultural production, crops	22	4.4	2.8	6.7

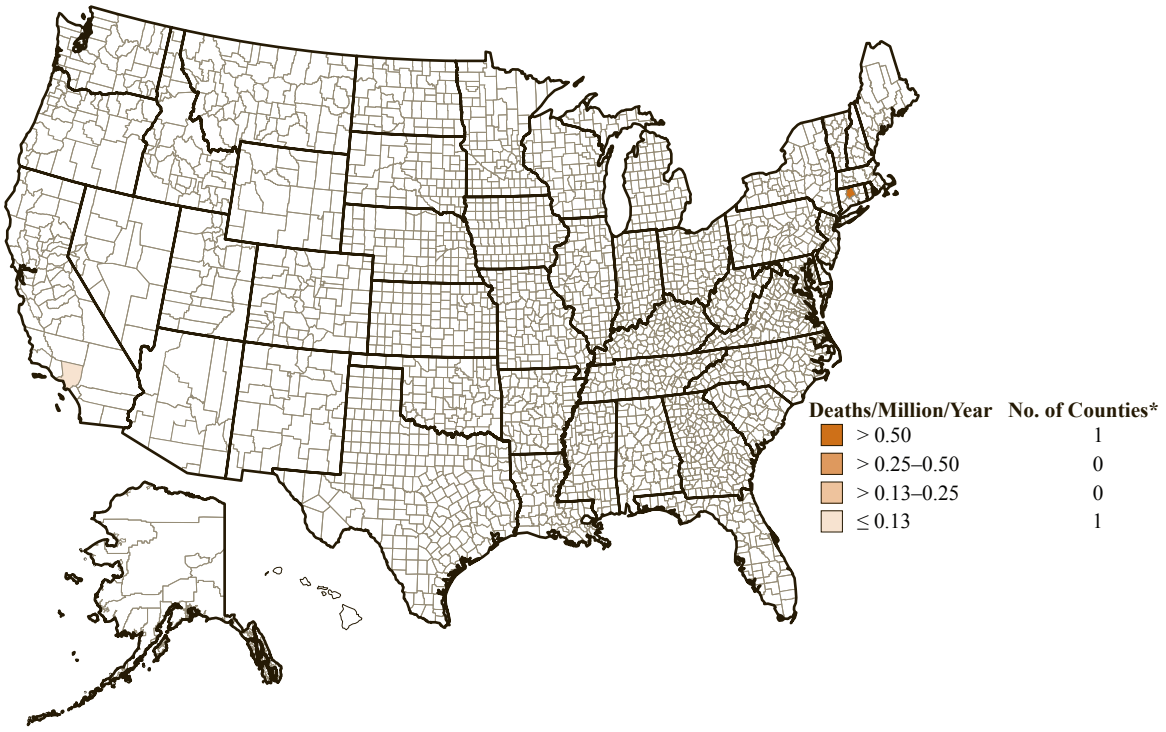
CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with hypersensitivity pneumonitis reported was 122 in these same selected states and years, and the comparable number of hypersensitivity pneumonitis deaths in the entire United States for this same time period was 398. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 8-9. Hypersensitivity pneumonitis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
473	Farmers, except horticulture	51	8.5	6.4	11.3

COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The total number of deaths with hypersensitivity pneumonitis reported was 122 in these same selected states and years, and the comparable number of hypersensitivity pneumonitis deaths in the entire United States for this same time period was 398. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Figure 8-3a. Hypersensitivity pneumonitis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1985–1994

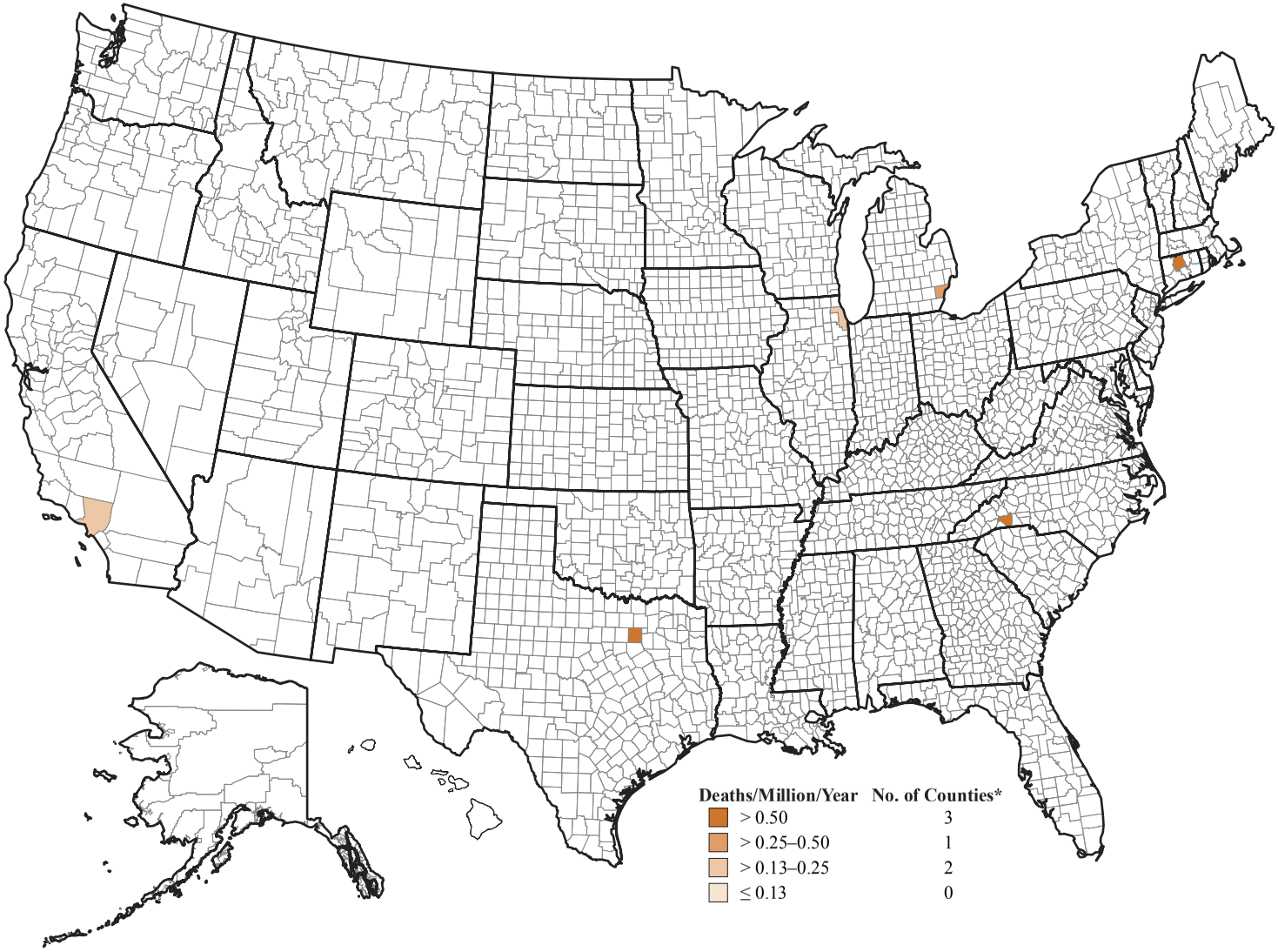


*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).

NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.

SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Figure 8-3b. Hypersensitivity pneumonitis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995–2004



*Age-adjusted rates have not been calculated for counties having less than 5 deaths with the disease of interest or for unincorporated counties (see Appendix H).
NOTE: See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Table 8-10. Hypersensitivity pneumonitis: Counties with highest age-adjusted death rates (per million population), U.S. residents age 15 and over, 1995–2004

County	State	Age-Adjusted Rate	Crude Rate	Number of Deaths	% Female
Rutherford County	North Carolina	8.7	10.0	5	100.0
Hartford County	Connecticut	0.7	0.7	5	80.0
Dallas County	Texas	0.6	0.4	7	57.1
Wayne County	Michigan	0.3	0.3	5	60.0
Los Angeles County	California	0.2	0.2	11	72.7
Cook County	Illinois	0.2	0.1	6	50.0
Overall United States		**0.3**	**0.2**	**540**	**38.0**

NOTE: Only counties with at least 5 deaths from the disease of interest are included. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau.

Section 9

Asthma

Table 9-1. Asthma: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
011	Agricultural production, livestock	274	1.5	1.3	1.7
862	Child day care services	68	1.4	1.1	1.8
642	Drug stores	85	1.3	1.1	1.7
840	Health services, n.e.c.	228	1.3	1.1	1.5
850	Colleges and universities	274	1.3	1.1	1.4
771	Laundry, cleaning, and garment services	178	1.2	1.0	1.4
831	Hospitals	1,110	1.1	1.1	1.2
901	General government, n.e.c.	502	1.1	1.0	1.2
010	Agricultural production, crops	687	1.1	1.0	1.2
961	Non-paid worker or non-worker or own home/at home	9,142	1.1	1.0	1.1

CIC - Census Industry Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of asthma deaths in the selected states for this same time period was 29,703, and the comparable number of asthma deaths in the entire United States for this same time period was 115,729. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 9-2. Asthma: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
098	Respiratory therapists	13	3.1	1.6	5.3
169	Social scientists, n.e.c.	8	2.9	1.2	5.6
758	Compressing and compacting machine operators	9	2.7	1.3	5.2
028	Purchasing agents and buyers, farm products	10	2.2	1.0	4.0
089	Health diagnosing practitioners, n.e.c.	11	2.2	1.1	3.9
197	Public relations specialists	17	2.1	1.2	3.3
317	Hotel clerks	13	2.0	1.1	3.4
085	Dentists	26	1.9	1.2	2.8
154	Postsecondary teachers, subject not specified	62	1.6	1.2	2.1
186	Musicians and composers	48	1.4	1.1	1.9
203	Clinical laboratory technologists and technicians	47	1.4	1.0	1.9
446	Health aides, except nursing	52	1.4	1.0	1.8
686	Butchers and meat cutters	66	1.4	1.1	1.7
915	Student	315	1.3	1.2	1.4
055	Electrical and electronic engineers	70	1.3	1.0	1.6
157	Teachers, secondary school	87	1.3	1.0	1.6
473	Farmers, except horticulture	796	1.2	1.1	1.3
917	Unemployed, never worked, disabled	603	1.2	1.1	1.3
207	Licensed practical nurses	153	1.2	1.0	1.4
095	Registered nurses	457	1.2	1.1	1.3
447	Nursing aides, orderlies, and attendants	465	1.2	1.1	1.3
914	Housewife/Homemaker	8,233	1.0	1.0	1.1

COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of asthma deaths in the selected states for this same time period was 29,703, and the comparable number of asthma deaths in the entire United States for this same time period was 115,729. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 9-3. Work-related asthma: Number of cases by classification and state, 1993–2002

Classification	California		Massachusetts		Michigan		New Jersey		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Work-aggravated asthma*	**553**	**29.6**	**51**	**10.2**	**199**	**13.2**	**31**	**12.0**	**834**	**20.2**
New-onset asthma†	**888**	**47.5**	**437**	**87.6**	**1,307**	**86.8**	**193**	**74.5**	**2,825**	**68.4**
Reactive airways dysfunction syndrome	***93***	***5.0***	***52***	***10.4***	***153***	***10.2***	***51***	***19.7***	***349***	***8.5***
Occupational asthma	***795***	***42.6***	***385***	***77.2***	***1,154***	***76.7***	***137***	***54.9***	***2,476***	***60.0***
Known asthma inducer‡ with objective evidence	-	-	-	-	22	1.5	2	0.8	24	0.6
Known asthma inducer with no objective evidence	151	8.1	136	27.3	516	34.3	59	22.8	862	20.9
Unknown asthma inducer	644	34.5	249	49.9	616	40.9	81	31.3	1,590	38.5
Unclassified	**427**	**22.9**	**11**	**2.2**	**-**	**-**	**35**	**13.5**	**473**	**11.5**
TOTAL	**1,868**	**100.0**	**499**	**100.0**	**1,506**	**100.0**	**259**	**100.0**	**4,132**	**100.0**

- indicates no cases reported.
* Pre-existing asthma aggravated by exposure or condition at work.
† Includes cases of reactive airways dysfunction syndrome and occupational asthma.
‡ Known asthma inducers, defined by medical literature review, are designated in the Association of Occupational and Environmental Clinics exposure coding scheme (www.aoec.org/tools.htm).
NOTE: Percentages may not sum to 100% due to rounding. See appendices for source description. For case identification and classification criteria, see *Appendix G.*
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by R Harrison and J Flattery (California); L Davis, E Pechter, and M Sharma (Massachusetts); K Rosenman, MJ Reilly, and D Kalinowski (Michigan); and D Valiante, D Schill, and K McGreevy (New Jersey).

Table 9-4. Work-related asthma: Number of cases by ascertainment source and state, 1993–2002

	California		Massachusetts		Michigan		New Jersey		Total	
Source	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Healthcare professional report*	1,868	100.0	463	92.8	1,087	72.2	186	71.8	3,604	87.2
Hospital data	-	-	29	5.8	382	25.4	69	26.6	480	11.6
Workers' compensation	-	-	7	1.4	5	0.3	2	0.8	14	0.3
Co-worker	-	-	-	-	14	0.9	-	-	14	0.3
Poison control	-	-	-	-	8	0.5	-	-	8	0.2
Other†	-	-	-	-	10	0.7	2	0.8	12	0.3
TOTAL	**1,868**	**100.0**	**499**	**100.0**	**1,506**	**100.0**	**259**	**100.0**	**4,132**	**100.0**

- indicates no cases reported.
* Massachusetts, Michigan, and New Jersey actively solicit reports from health care professionals; California uses an existing administrative data source to passively identify health care professional reports of work-related asthma.
† Some cases have been identified through death certificates, self reports, or reports from the Mine Safety and Health Administration or Occupational Safety and Health Administration.
NOTE: Percentages may not sum to 100% due to rounding. Hospital data may include hospital discharge data and emergency department visit data. See appendices for source description.
SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by R Harrison and J Flattery (California); L Davis, E Pechter, and M Sharma (Massachusetts); K Rosenman, MJ Reilly, and D Kalinowski (Michigan); and D Valiante, D Schill, and K McGreevy (New Jersey).

Table 9-5 (page 1 of 3). Work-related asthma: Most frequently reported agents associated with work-related asthma cases by state, 1993–2002

		California		Massachusetts		Michigan		New Jersey		Total	
Code*	Agent	No.	%	No.	%	No.	%	No.	%	No.	%
320.06	Chemicals, n.o.s.	204	10.9	35	7.0	136	9.0	29	11.2	404	9.8
010.00	Dust, n.o.s.	293	15.7	50	10.0	30	2.0	13	5.0	386	9.3
320.01	Air pollutants, indoor	137	7.3	103	20.6	103	6.8	25	9.7	368	8.9
322.00	Cleaning materials, n.o.s.	118	6.3	41	8.2	103	6.8	7	2.7	269	6.5
330.03	Smoke, n.o.s.	117	6.3	25	5.0	81	5.4	10	3.9	233	5.6
390.01	Mold, n.o.s.	144	7.7	53	10.6	11	0.7	10	3.9	218	5.3
170.01	Cutting oils	4	0.2	8	1.6	182	12.1	2	0.8	196	4.7
171.01	Paint	103	5.5	21	4.2	59	3.9	6	2.3	189	4.6
221.00	Diisocyanates, n.o.s.	22	1.2	18	3.6	90	6.0	3	1.2	133	3.2
270.02	Latex, natural rubber	33	1.8	42	8.4	47	3.1	9	3.5	131	3.2
171.00	Solvents, n.o.s.	37	2.0	19	3.8	44	2.9	10	3.9	110	2.7
023.01	Welding fume, stainless steel	5	0.3	-	-	97	6.4	1	0.4	103	2.5
320.11	Glues, n.o.s.	48	2.6	14	2.8	23	1.5	6	2.3	91	2.2
120.03	Formaldehyde	26	1.4	23	4.6	35	2.3	6	2.3	90	2.2
320.33	Air pollutants, indoor-building renovation	75	4.0	5	1.0	-	-	-	-	80	1.9
320.16	Pesticides, n.o.s.	64	3.4	7	1.4	5	0.3	2	0.8	78	1.9
322.10	Bleach	26	1.4	12	2.4	35	2.3	5	1.9	78	1.9
331.01	Diesel exhaust	41	2.2	9	1.8	16	1.1	9	3.5	75	1.8
221.01	Toluene diisocyanate	6	0.3	6	1.2	58	3.9	2	0.8	72	1.7
330.01	Cigarette smoke	45	2.4	9	1.8	16	1.1	1	0.4	71	1.7
010.09	Man-made mineral fibers	39	2.1	14	2.8	11	0.7	1	0.4	65	1.6
320.23	Perfume, n.o.s.	54	2.9	7	1.4	4	0.3	-	-	65	1.6
221.02	Methylene diisocyanate	4	0.2	-	-	55	3.7	3	1.2	62	1.5
030.02	Chlorine	29	1.6	2	0.4	23	1.5	7	2.7	61	1.5
120.05	Glutaraldehyde	17	0.9	17	3.4	10	0.7	7	2.7	51	1.2
010.02	Asbestos	35	1.9	10	2.0	5	0.3	-	-	50	1.2
373.00	Wood dust, n.o.s.	26	1.4	4	0.8	17	1.1	3	1.2	50	1.2
322.21	Cleaners, floor stripping	16	0.9	12	2.4	15	1.0	2	0.8	45	1.1
023.00	Welding, n.o.s.	21	1.1	13	2.6	3	0.2	7	2.7	44	1.1
330.02	Plastic smoke	13	0.7	1	0.2	24	1.6	4	1.5	42	1.0
360.04	Stress	40	2.1	1	0.2	1	0.1	-	-	42	1.0
050.00	Acids, bases, oxidizers, n.o.s.	4	0.2	6	1.2	27	1.8	3	1.2	40	1.0
110.02	Epoxy resins	5	0.3	7	1.4	26	1.7	1	0.4	39	0.9
322.19	Cleaners, disinfectant, n.o.s.	24	1.3	9	1.8	4	0.3	-	-	37	0.9
010.03	Cement dust	22	1.2	8	1.6	6	0.4	-	-	36	0.9
060.11	4-Phenylcyclohexene	31	1.7	5	1.0	-	-	-	-	36	0.9
370.00	Plant material, n.o.s.	29	1.6	2	0.4	4	0.3	-	-	35	0.8
161.00	Polycyclic aromatic hydrocarbons, n.o.s.	31	1.7	-	-	3	0.2	-	-	34	0.8

See footnotes at end of table.

Table 9-5 (page 2 of 3). Work-related asthma: Most frequently reported agents associated with work-related asthma cases by state, 1993–2002

		California		Massachusetts		Michigan		New Jersey		Total	
Code*	Agent	No.	%	No.	%	No.	%	No.	%	No.	%
322.16	Cleaners, carpet	23	1.2	1	0.2	9	0.6	1	0.4	34	0.8
142.00	Acrylates, n.o.s.	-	-	2	0.4	26	1.7	-	-	28	0.7
331.00	Exhaust, n.o.s.	20	1.1	5	1.0	-	-	2	0.8	27	0.7
370.01	Paper dust	13	0.7	2	0.4	3	0.2	7	2.7	25	0.6
322.07	Ammonia solution, n.o.s.	17	0.9	5	1.0	1	0.1	1	0.4	24	0.6
021.00	Metal dust, n.o.s.	17	0.9	3	0.6	2	0.1	1	0.4	23	0.6
350.03	Heat	17	0.9	2	0.4	4	0.3	-	-	23	0.6
380.00	Animal material, n.o.s.	10	0.5	4	0.8	8	0.5	1	0.4	23	0.6
371.00	Flour, n.o.s.	6	0.3	4	0.8	9	0.6	3	1.2	22	0.5
370.10	Pollen	20	1.1	-	-	-	-	1	0.4	21	0.5
050.10	Hydrochloric acid	7	0.4	2	0.4	5	0.3	6	2.3	20	0.5
050.18	Sodium hydroxide	6	0.3	4	0.8	7	0.5	3	1.2	20	0.5
052.01	Ammonia gas	1	0.1	2	0.4	15	1.0	2	0.8	20	0.5
050.24	Sulfuric acid	12	0.6	1	0.2	4	0.3	2	0.8	19	0.5
331.02	Engine exhaust	3	0.2	2	0.4	8	0.5	6	2.3	19	0.5
010.13	Silica, crystalline	12	0.6	2	0.4	3	0.2	1	0.4	18	0.4
040.20	Sulfur oxides	10	0.5	2	0.4	3	0.2	3	1.2	18	0.4
160.02	Toluene	4	0.2	5	1.0	3	0.2	6	2.3	18	0.4
320.17	Photo developing chemicals, n.o.s.	7	0.4	8	1.6	2	0.1	1	0.4	18	0.4
320.29	Printing chemicals, n.o.s.	3	0.2	6	1.2	9	0.6	-	-	18	0.4
020.15	Cobalt	-	-	1	0.2	15	1.0	1	0.4	17	0.4
160.03	Xylene	7	0.4	2	0.4	6	0.4	2	0.8	17	0.4
370.35	Capsicum	15	0.8	-	-	1	0.1	1	0.4	17	0.4
010.04	Carbon black	12	0.6	2	0.4	1	0.1	1	0.4	16	0.4
061.04	Gasoline	10	0.5	1	0.2	2	0.1	3	1.2	16	0.4
170.00	Hydrocarbons, n.o.s.	14	0.7	2	0.4	-	-	-	-	16	0.4
380.04	Dander, animal	14	0.7	1	0.2	1	0.1	-	-	16	0.4
040.04	Carbon monoxide	8	0.4	5	1.0	-	-	2	0.8	15	0.4
070.05	Ethanol	9	0.5	-	-	4	0.3	2	0.8	15	0.4
320.15	Odors	13	0.7	1	0.2	1	0.1	-	-	15	0.4
061.00	Petroleum fractions, n.o.s.	5	0.3	-	-	7	0.5	2	0.8	14	0.3
231.00	Ethanolamines, n.o.s.	9	0.5	-	-	5	0.3	-	-	14	0.3
373.02	California redwood	14	0.7	-	-	-	-	-	-	14	0.3
130.01	Acetone	8	0.4	2	0.4	3	0.2	-	-	13	0.3
171.02	Thinner	10	0.5	2	0.4	-	-	1	0.4	13	0.3
171.07	Lacquer	11	0.6	2	0.4	-	-	-	-	13	0.3
180.03	Hydroquinone	6	0.3	4	0.8	3	0.2	-	-	13	0.3
270.07	Polyurethane	7	0.4	6	1.2	-	-	-	-	13	0.3

See footnotes at end of table.

Table 9-5 (page 3 of 3). Work-related asthma: Most frequently reported agents associated with work-related asthma cases by state, 1993–2002

		California		Massachusetts		Michigan		New Jersey		Total	
Code*	Agent	No.	%	No.	%	No.	%	No.	%	No.	%
370.03	Grain dust	7	0.4	1	0.2	5	0.3	-	-	13	0.3
370.07	Grass cuttings	11	0.6	1	0.2	-	-	1	0.4	13	0.3
171.06	Paint, oil-based	10	0.5	2	0.4	-	-	-	-	12	0.3
221.04	Hexamethylene diisocyanate	-	-	1	0.2	11	0.7	-	-	12	0.3
322.22	Cleaners, graffiti removing	11	0.6	1	0.2	-	-	-	-	12	0.3
350.02	Cold	9	0.5	1	0.2	-	-	2	0.8	12	0.3
320.12	Hair products	3	0.2	4	0.8	4	0.3	-	-	11	0.3
320.14	Lubricants, n.o.s.	2	0.1	1	0.2	6	0.4	2	0.8	11	0.3
380.01	Antigens, animal	11	0.6	-	-	-	-	-	-	11	0.3
382.13	Mites, n.o.s.	9	0.5	1	0.2	-	-	1	0.4	11	0.3
024.00	Soluble halogenated platinum compounds	-	-	-	-	-	-	10	3.9	10	0.2
060.08	Natural gas	7	0.4	2	0.4	1	0.1	-	-	10	0.2
320.10	Fire extinguisher discharge	10	0.5	-	-	-	-	-	-	10	0.2
320.13	Herbicides, n.o.s.	9	0.5	-	-	-	-	1	0.4	10	0.2
320.28	Cosmetics, n.o.s.	6	0.3	2	0.4	-	-	2	0.8	10	0.2
	All others	451	24.1	187	37.5	163	10.8	102	39.4	903	21.9

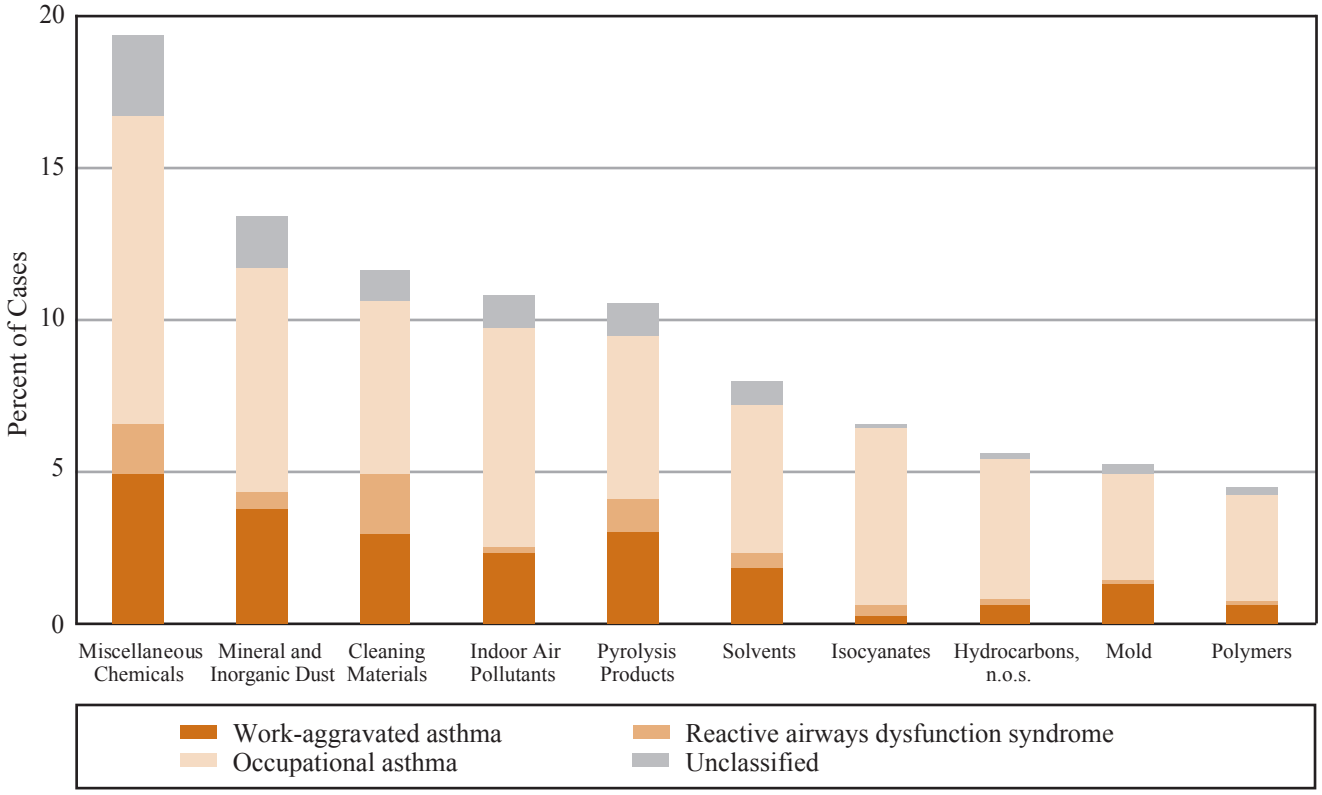
- indicates no cases reported. n.o.s. - not otherwise specified

* Association of Occupational and Environmental Clinics (AOEC) exposure codes, 05/2005 (www.aoec.org)

NOTE: Number column sums exceed the corresponding number of cases because each case was associated with up to three putative agents. Percentages are based on the number of cases reported from California (n=1,868), Massachusetts (n=499), Michigan (n=1,506), and New Jersey (n=259). See appendices for source description and methods.

SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by R Harrison and J Flattery (California); L Davis, E Pechter, and M Sharma (Massachusetts); K Rosenman, MJ Reilly, and D Kalinowski (Michigan); and D Valiante, D Schill, and K McGreevy (New Jersey).

Figure 9-1. Work-related asthma: Most frequently reported agent categories associated with cases of work-related asthma, 1993–2002



n.o.s. - not otherwise specified

NOTE: Each case was associated with up to three putative agents. Percentages are based on the number of cases (n=4,132). The category 'Miscellaneous Chemicals' accounts for a large range of exposures including pesticides, perfume, enzymes, and odors; 'Mineral and Inorganic Dust' includes exposures such as plaster, fiberglass, and cement; 'Indoor Air Pollutants' includes pollutants from building renovation; 'Pyrolysis Products' includes smoke and diesel exhaust; 'Solvents' includes paint and paint thinners; 'Hydrocarbons, n.o.s.' includes cutting oils; and 'Polymers' includes natural rubber latex. AOEC lists some exposures in these categories as known asthmagens. For agent categorization methods, see *Appendix B*. For case identification and classification criteria, see *Appendix G*.

SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by R Harrison and J Flattery (California); L Davis, E Pechter, and M Sharma (Massachusetts); K Rosenman, MJ Reilly, and D Kalinowski (Michigan); and D Valiante, D Schill, and K McGreevy (New Jersey).

Table 9-6 (page 1 of 2). Work-related asthma: Primary industries associated with work-related asthma cases by state, 1993–2002

Industry (SIC)	California		Massachusetts		Michigan		New Jersey		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Agriculture, forestry, and fishing	**76**	**4.1**	**5**	**1.0**	**8**	**0.5**	**2**	**0.8**	**91**	**2.2**
Agricultural production crops (01)	33	1.8	-	-	2	0.1	-	-	35	0.8
Agricultural services (07)	17	0.9	3	0.6	2	0.1	2	0.8	24	0.6
Forestry (08)	20	1.1	-	-	-	-	-	-	20	0.5
Agricultural production livestock and animal specialties (02)	4	0.2	2	0.4	4	0.3	-	-	10	0.2
All others within this division	2	0.1	-	-	-	-	-	-	2	0.0
Mining (10,13,14)	**2**	**0.1**	**-**	**-**	**3**	**0.2**	**-**	**-**	**5**	**0.1**
Construction	**62**	**3.3**	**21**	**4.2**	**36**	**2.4**	**16**	**6.2**	**135**	**3.3**
Construction, special trade contractors (17)	34	1.8	14	2.8	31	2.1	14	5.4	93	2.3
Building construction, general contractors and operative builders (15)	18	1.0	2	0.4	1	0.1	1	0.4	22	0.5
Heavy construction other than building construction, contractors (16)	10	0.5	5	1.0	4	0.3	1	0.4	20	0.5
Manufacturing	**274**	**14.7**	**126**	**25.3**	**1,004**	**66.7**	**93**	**35.9**	**1,497**	**36.2**
Transportation equipment (37)	47	2.5	4	0.8	631	41.9	4	1.5	686	16.6
Chemicals and allied products (28)	20	1.1	22	4.4	47	3.1	22	8.5	111	2.7
Fabricated metal products except machinery and transportation equipment (34)	21	1.1	12	2.4	62	4.1	2	0.8	97	2.3
Industrial and commercial machinery and computer equipment (35)	22	1.2	13	2.6	53	3.5	3	1.2	91	2.2
Food and kindred products (20)	41	2.2	9	1.8	23	1.5	15	5.8	88	2.1
Rubber and miscellaneous plastics products (30)	3	0.2	7	1.4	53	3.5	8	3.1	71	1.7
Electronic and other electrical equipment and components, except computers (36)	29	1.6	14	2.8	11	0.7	8	3.1	62	1.5
Primary metal industries (33)	8	0.4	-	-	44	2.9	8	3.1	60	1.5
Lumber and wood products, except furniture (24)	32	1.7	1	0.2	14	0.9	-	-	47	1.1
Miscellaneous manufacturing industries (39)	9	0.5	12	2.4	18	1.2	2	0.8	41	1.0
Measuring, analyzing, and controlling instruments (38)	15	0.8	10	2.0	6	0.4	2	0.8	33	0.8
Stone, clay, glass, and concrete products (32)	14	0.7	2	0.4	9	0.6	2	0.8	27	0.7
Paper and allied products (26)	3	0.2	6	1.2	10	0.7	7	2.7	26	0.6
Printing, publishing, and allied industries (27)	3	0.2	5	1.0	14	0.9	3	1.2	25	0.6
All others within this division	7	0.4	9	1.8	9	0.6	7	2.7	32	0.8
Transportation	**154**	**8.2**	**12**	**2.4**	**29**	**1.9**	**11**	**4.2**	**206**	**5.0**
Local and suburban transit and interurban highway passenger transportation (41)	39	2.1	2	0.4	2	0.1	4	1.5	47	1.1
Communications (48)	39	2.1	1	0.2	3	0.2	-	-	43	1.0
Electric, gas, and sanitary services (49)	26	1.4	4	0.8	7	0.5	2	0.8	39	0.9
Motor freight transportation and warehousing (42)	24	1.3	-	-	7	0.5	2	0.8	33	0.8
Transportation by air (45)	14	0.7	2	0.4	3	0.2	1	0.4	20	0.5
United States Postal service (43)	11	0.6	-	-	2	0.1	-	-	13	0.3
All others within this division	1	0.1	3	0.6	5	0.3	2	0.8	11	0.3
Wholesale trade	**38**	**2.0**	**9**	**1.8**	**21**	**1.4**	**5**	**1.9**	**73**	**1.8**
Wholesale trade, durable goods (50)	18	1.0	5	1.0	12	0.8	2	0.8	37	0.9
Wholesale trade, nondurable goods (51)	20	1.1	4	0.8	9	0.6	3	1.2	36	0.9

See footnotes at end of table.

Table 9-6 (page 2 of 2). Work-related asthma: Primary industries associated with work-related asthma cases by state, 1993–2002

Industry (SIC)	California		Massachusetts		Michigan		New Jersey		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Retail trade	**94**	**5.0**	**20**	**4.0**	**43**	**2.9**	**6**	**2.3**	**163**	**3.9**
Eating and drinking places (58)	19	1.0	5	1.0	13	0.9	-	-	37	0.9
Food stores (54)	22	1.2	4	0.8	7	0.5	2	0.8	35	0.8
Miscellaneous retail (59)	16	0.9	3	0.6	5	0.3	1	0.4	25	0.6
Automotive dealers and gasoline service stations (55)	11	0.6	2	0.4	8	0.5	2	0.8	23	0.6
General merchandise stores (53)	13	0.7	2	0.4	6	0.4	1	0.4	22	0.5
All others within this division	13	0.7	4	0.8	4	0.3	-	-	21	0.5
Finance, insurance, and real estate	**56**	**3.0**	**4**	**0.8**	**12**	**0.8**	**2**	**0.8**	**74**	**1.8**
Insurance carriers (63)	15	0.8	2	0.4	3	0.2	1	0.4	21	0.5
Real estate (65)	16	0.9	-	-	5	0.3	-	-	21	0.5
Depository institutions (60)	17	0.9	1	0.2	1	0.1	-	-	19	0.5
All others within this division	8	0.4	1	0.2	3	0.3	-	-	13	0.3
Services	**828**	**44.3**	**253**	**50.7**	**303**	**20.1**	**73**	**28.2**	**1,457**	**35.3**
Health services (80)	307	16.4	145	29.1	165	11.0	34	13.1	651	15.8
Educational services (82)	242	13	64	12.8	60	4.0	17	6.6	383	9.3
Social services (83)	92	4.9	5	1.0	8	0.5	5	1.9	110	2.7
Business services (73)	61	3.3	6	1.2	14	0.9	2	0.8	83	2.0
Amusement and recreation services (79)	36	1.9	4	0.8	6	0.4	-	-	46	1.1
Engineering, accounting, research, management, and related services (87)	26	1.4	6	1.2	7	0.5	5	1.9	44	1.1
Hotels, rooming houses, camps and other lodging places (70)	15	0.8	3	0.6	14	0.9	2	0.8	34	0.8
Automotive repair, services and parking (75)	15	0.8	7	1.4	9	0.6	3	1.2	34	0.8
Personal services (72)	11	0.6	8	1.6	10	0.7	3	1.2	32	0.8
Membership organizations (86)	9	0.5	3	0.6	4	0.3	-	-	16	0.4
Miscellaneous repair services (76)	6	0.3	1	0.2	2	0.1	1	0.4	10	0.2
All others within this division	8	0.4	1	0.2	4	0.3	1	0.4	14	0.3
Public administration	**266**	**14.2**	**49**	**9.8**	**41**	**2.7**	**19**	**7.3**	**375**	**9.1**
Justice, public order, and safety (92)	133	7.1	20	4.0	19	1.3	5	1.9	177	4.3
Executive, legislative, general government, except finance (91)	50	2.7	7	1.4	1	0.1	6	2.3	64	1.5
Administration of economic programs (96)	22	1.2	13	2.6	6	0.4	1	0.4	42	1.0
Administration of human resource programs (94)	28	1.5	4	0.8	6	0.4	3	1.2	41	1.0
Administration of environmental quality and housing programs (95)	11	0.6	1	0.2	6	0.4	-	-	18	0.4
Public finance, taxation, and monetary policy (93)	14	0.7	1	0.2	1	0.1	1	0.4	17	0.4
National security and international affairs (97)	8	0.4	3	0.6	2	0.1	3	1.2	16	0.4
Unclassifiable	**18**	**1.0**	**-**	**-**	**6**	**0.4**	**32**	**12.4**	**56**	**1.4**
TOTAL	**1,868**	**100.0**	**499**	**100.0**	**1,506**	**100.0**	**259**	**100.0**	**4,132**	**100.0**

- indicates no cases reported. SIC - Standard Industrial Classification

NOTE: Percentages are based on total number of cases by state, but may not sum to 100% due to rounding. See appendices for source description and methods.

SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by R Harrison and J Flattery (California); L Davis, E Pechter, and M Sharma (Massachusetts); K Rosenman, MJ Reilly, and D Kalinowski (Michigan); and D Valiante, D Schill, and K McGreevy (New Jersey).

Table 9-7 (page 1 of 3). Work-related asthma: Primary occupations associated with work-related asthma cases by state, 1993–2002

	California		Massachusetts		Michigan		New Jersey		Total	
Occupation (COC)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Managerial and professional specialty	**417**	**22.3**	**164**	**32.9**	**157**	**10.4**	**46**	**17.8**	**784**	**19.0**
Registered nurses (095)	93	5.0	74	14.8	44	2.9	11	4.2	222	5.4
Teachers, elementary school (156)	43	2.3	12	2.4	3	0.2	3	1.2	61	1.5
Managers and administrators, n.e.c. (022)	37	2.0	6	1.2	7	0.5	-	-	50	1.2
Teachers, secondary school (157)	16	0.9	14	2.8	6	0.4	3	1.2	39	0.9
Teachers, n.e.c. (159)	14	0.7	6	1.2	15	1.0	3	1.2	38	0.9
Social workers (174)	20	1.1	5	1.0	7	0.5	2	0.8	34	0.8
Management related occupations, n.e.c. (037)	21	1.1	7	1.4	3	0.2	1	0.4	32	0.8
Teachers, special education (158)	11	0.6	3	0.6	2	0.1	1	0.4	17	0.4
Computer systems analysts, scientists (064)	14	0.7	-	-	-	-	1	0.4	15	0.4
Respiratory therapists (098)	9	0.5	1	0.2	3	0.2	-	-	13	0.3
Accountants and auditors (023)	8	0.4	1	0.2	3	0.2	-	-	12	0.3
Administrators, officials, public administration (005)	8	0.4	-	-	2	0.1	1	0.4	11	0.3
Chemists, except biochemists (073)	2	0.1	3	0.6	2	0.1	4	1.5	11	0.3
Personnel, training, and labor relations specialists (027)	7	0.4	-	-	3	0.2	-	-	10	0.2
Physicians (084)	2	0.1	2	0.4	6	0.4	-	-	10	0.2
All others within this grouping	112	6.0	30	6.0	51	3.4	16	6.2	209	5.1
Technical, sales, and administrative support	**552**	**29.6**	**107**	**21.4**	**137**	**9.1**	**44**	**17**	**840**	**20.3**
General office clerks (379)	66	3.5	16	3.2	8	0.5	3	1.2	93	2.3
Health technologists and technicians, n.e.c. (208)	40	2.1	6	1.2	11	0.7	6	2.3	63	1.5
Secretaries (313)	37	2.0	11	2.2	9	0.6	3	1.2	60	1.5
Licensed practical nurses (207)	24	1.3	8	1.6	6	0.4	2	0.8	40	1.0
Administrative support, n.e.c. (389)	27	1.4	3	0.6	7	0.5	1	0.4	38	0.9
Investigators and adjusters, except insurance (376)	21	1.1	3	0.6	1	0.1	3	1.2	28	0.7
Cashiers (276)	18	1.0	4	0.8	1	0.1	-	-	23	0.6
Bookkeepers, accounting, and auditing clerks (337)	21	1.1	1	0.2	-	-	1	0.4	23	0.6
Receptionists (319)	19	1.0	-	-	2	0.1	1	0.4	22	0.5
Typists (315)	15	0.8	4	0.8	1	0.1	1	0.4	21	0.5
Clinical laboratory technologists and technicians (203)	8	0.4	8	1.6	2	0.1	2	0.8	20	0.5
Radiologic technicians (206)	10	0.5	4	0.8	3	0.2	1	0.4	18	0.4
Order clerks (327)	14	0.7	2	0.4	2	0.1	-	-	18	0.4
Traffic, shipping, receiving and clerks (364)	6	0.3	1	0.2	11	0.7	-	-	18	0.4
Teachers' aides (387)	12	0.6	2	0.4	2	0.1	1	0.4	17	0.4
Supervisors and proprietors, sales occupations (243)	13	0.7	1	0.2	2	0.1	-	-	16	0.4
Supervisors, general office (303)	10	0.5	3	0.6	3	0.2	-	-	16	0.4
Stock and inventory clerks (365)	9	0.5	1	0.2	5	0.3	1	0.4	16	0.4
Technicians, n.e.c. (235)	11	0.6	-	-	1	0.1	2	0.8	14	0.3
Chemical technicians (224)	5	0.3	2	0.4	4	0.3	2	0.8	13	0.3
Records clerks (336)	5	0.3	2	0.4	5	0.3	-	-	12	0.3
Electrical/electronic technician (213)	9	0.5	1	0.2	1	0.1	-	-	11	0.3
Science technicians, n.e.c. (225)	1	0.1	-	-	6	0.4	4	1.5	11	0.3
Telephone operators (348)	10	0.5	-	-	1	0.1	-	-	11	0.3
Dental hygienists (204)	1	0.1	3	0.6	5	0.3	1	0.4	10	0.2
Sales workers, other commodities (274)	8	0.4	-	-	2	0.1	-	-	10	0.2
Eligibility clerks, social welfare workers (377)	10	0.5	-	-	-	-	-	-	10	0.2
All others within this grouping	122	6.5	21	4.2	36	2.4	9	3.5	188	4.5

See footnotes at end of table.

Table 9-7 (page 2 of 3). Work-related asthma: Primary occupations associated with work-related asthma cases by state, 1993–2002

	California		Massachusetts		Michigan		New Jersey		Total	
Occupation (COC)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Service	**292**	**15.6**	**62**	**12.4**	**147**	**9.8**	**26**	**10**	**527**	**12.8**
Janitors and cleaners (453)	65	3.5	6	1.2	48	3.2	7	2.7	126	3.0
Firefighting occupations (417)	35	1.9	8	1.6	3	0.2	2	0.8	48	1.2
Nursing aides, orderlies, and attendants (447)	20	1.1	12	2.4	5	0.3	3	1.2	40	1.0
Health aides, except nursing (446)	9	0.5	1	0.2	23	1.5	3	1.2	36	0.9
Supervisors, cleaning and building service workers (448)	8	0.4	1	0.2	18	1.2	-	-	27	0.7
Correctional institution officers (424)	21	1.1	1	0.2	3	0.2	1	0.4	26	0.6
Maids and housemen (449)	11	0.6	5	1.0	7	0.5	3	1.2	26	0.6
Miscellaneous food preparation occupations (444)	16	0.9	2	0.4	7	0.5	-	-	25	0.6
Cooks (436)	11	0.6	2	0.4	7	0.5	2	0.8	22	0.5
Police and detectives, public service (418)	15	0.8	-	-	1	0.1	1	0.4	17	0.4
Hairdressers and cosmetologists (458)	6	0.3	7	1.4	3	0.2	-	-	16	0.4
Guards and police, except public service (426)	8	0.4	5	1.0	1	0.1	-	-	14	0.3
Dental assistants (445)	2	0.1	2	0.4	7	0.5	-	-	11	0.3
All others within this grouping	65	3.5	10	2.0	14	0.9	4	1.5	93	2.3
Farming, forestry, and fishing	**59**	**3.2**	**6**	**1.2**	**9**	**0.6**	**2**	**0.8**	**76**	**1.8**
Farm workers (479)	25	1.3	-	-	1	0.1	-	-	26	0.6
Groundskeepers and gardeners, except farm (486)	17	0.9	1	0.2	-	-	1	0.4	19	0.5
All others within this grouping	17	0.9	5	1.0	8	0.5	1	0.4	31	0.8
Precision production, craft and repair	**152**	**8.1**	**65**	**13**	**224**	**14.9**	**39**	**15.1**	**480**	**11.6**
Supervisors, production (628)	13	0.7	6	1.2	34	2.3	4	1.5	57	1.4
Millwrights (544)	1	0.1	1	0.2	39	2.6	-	-	41	1.0
Optical goods workers (677)	2	0.1	-	-	27	1.8	-	-	29	0.7
Electricians (575)	9	0.5	-	-	12	0.8	5	1.9	26	0.6
Plumbers, pipe fitters, and steamfitters (585)	5	0.3	2	0.4	13	0.9	2	0.8	22	0.5
Machinists (637)	4	0.2	4	0.8	10	0.7	2	0.8	20	0.5
Specified mechanics and repairers, n.e.c. (547)	4	0.2	-	-	13	0.9	2	0.8	19	0.5
Carpenters (567)	9	0.5	7	1.4	-	-	2	0.8	18	0.4
Painters, construction, maintenance (579)	11	0.6	-	-	4	0.3	1	0.4	16	0.4
Electrical and electronic equipment assemblers (683)	10	0.5	4	0.8	-	-	1	0.4	15	0.4
Industrial machinery repairers (518)	3	0.2	3	0.6	4	0.3	3	1.2	13	0.3
Construction trades, n.e.c. (599)	3	0.2	3	0.6	7	0.5	-	-	13	0.3
Bakers (687)	4	0.2	4	0.8	2	0.1	1	0.4	11	0.3
Bus, truck, stationary engine mechanics (507)	6	0.3	-	-	3	0.2	1	0.4	10	0.2
Not specified mechanics and repairers (549)	6	0.3	3	0.6	-	-	1	0.4	10	0.2
All others within this grouping	62	3.3	28	5.6	56	3.7	14	5.4	160	3.9

See footnotes at end of table.

Table 9-7 (page 3 of 3). Work-related asthma: Primary occupations associated with work-related asthma cases by state, 1993–2002

	California		Massachusetts		Michigan		New Jersey		Total	
Occupation (COC)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Operators, fabricators, and laborers	**287**	**15.4**	**94**	**18.8**	**752**	**49.9**	**69**	**26.6**	**1,202**	**29.1**
Assemblers (785)	16	0.9	6	1.2	182	12.1	1	0.4	205	5.0
Welders and cutters (783)	16	0.9	8	1.6	66	4.4	5	1.9	95	2.3
Laborers, except construction (889)	23	1.2	5	1.0	57	3.8	2	0.8	87	2.1
Miscellaneous machine operators, n.e.c. (777)	20	1.1	5	1.0	34	2.3	7	2.7	66	1.6
Miscellaneous metal, plastic, stone and glass working machine operators (715)	1	0.1	-	-	57	3.8	-	-	58	1.4
Production inspectors, checkers and examiners (796)	5	0.3	3	0.6	37	2.5	1	0.4	46	1.1
Painting and paint spray machine operators (759)	9	0.5	12	2.4	17	1.1	2	0.8	40	1.0
Bus drivers (808)	27	1.4	-	-	4	0.3	-	-	31	0.8
Hand painting, coating, and decorating occupations (789)	1	0.1	1	0.2	27	1.8	1	0.4	30	0.7
Truck drivers (804)	18	1.0	-	-	7	0.5	5	1.9	30	0.7
Machine feeders and offbearers (878)	1	0.1	-	-	28	1.9	-	-	29	0.7
Mixing and blending machine operators (756)	6	0.3	7	1.4	14	0.9	1	0.4	28	0.7
Freight, stock, and material handlers, n.e.c. (883)	14	0.7	3	0.6	10	0.7	-	-	27	0.7
Molding and casting machine operators (719)	3	0.2	1	0.2	22	1.5	-	-	26	0.6
Separating, filtering & clarifying machine operators (757)	7	0.4	3	0.6	5	0.3	10	3.9	25	0.6
Machine operators, not specified (779)	11	0.6	8	1.6	-	-	5	1.9	24	0.6
Pressing machine operators (747)	-	-	-	-	22	1.5	-	-	22	0.5
Construction laborers (869)	19	1.0	1	0.2	1	0.1	1	0.4	22	0.5
Packaging and filling machine operators (754)	7	0.4	2	0.4	4	0.3	8	3.1	21	0.5
Industrial truck and tractor equipment operators (856)	5	0.3	-	-	10	0.7	4	1.5	19	0.5
Grinding, abrading, buffing & polishing machine (709)	-	-	3	0.6	12	0.8	1	0.4	16	0.4
Textile sewing machine operators (744)	2	0.1	2	0.4	11	0.7	-	-	15	0.4
Hand packers and packagers (888)	3	0.2	2	0.4	9	0.6	1	0.4	15	0.4
Laundering and dry cleaning machine operators (748)	5	0.3	2	0.4	3	0.2	2	0.8	12	0.3
Metal plating machine operators (723)	1	0.1	2	0.4	7	0.5	1	0.4	11	0.3
Printing press operators (734)	3	0.2	2	0.4	4	0.3	1	0.4	10	0.2
Miscellaneous hand working occupations (795)	2	0.1	-	-	8	0.5	-	-	10	0.2
Operating engineers (844)	8	0.4	1	0.2	-	-	1	0.4	10	0.2
All others within this grouping	54	2.9	15	3.0	94	6.2	9	3.5	172	4.2
Military occupations	**2**	**0.1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**0.0**
Unclassifiable and miscellaneous unemployed	**107**	**5.7**	**1**	**0.2**	**80**	**5.3**	**33**	**12.7**	**221**	**5.3**
TOTAL	**1,868**	**100.0**	**499**	**100.0**	**1,506**	**100.0**	**259**	**100.0**	**4,132**	**100.0**

- indicates no cases reported. n.e.c. - not elsewhere classified COC - Census Occupation Code

NOTE: Percentages are based on total number of cases by state, but may not sum to 100% due to rounding. See appendices for source description and methods.

SOURCE: Provisional Sentinel Event Notification Systems for Occupational Risks surveillance data as of September 2006, reported by R Harrison and J Flattery (California); L Davis, E Pechter, and M Sharma (Massachusetts); K Rosenman, MJ Reilly, and D Kalinowski (Michigan); and D Valiante, D Schill, and K McGreevy (New Jersey).

Table 9-8. Asthma: Estimated prevalence by current industry, U.S. residents age 18 and over, 1997–2004

Industry	Estimated Population	Asthma Prevalence (%)	Asthma 95% Confidence Interval	Asthma Attack in Past 12 Months Prevalence (%)	Asthma Attack in Past 12 Months 95% Confidence Interval
Social services, religious and membership organizations	4,792,065	11.2	10.2 – 12.1	5.0	4.3 – 5.6
Health services, except hospitals	7,127,658	10.9	10.2 – 11.7	4.6	4.1 – 5.1
Eating and drinking places	5,859,543	10.9	10.0 – 11.8	4.0	3.4 – 4.5
Banking and credit agencies	2,834,368	10.7	9.5 – 11.9	3.7	2.9 – 4.4
Elementary and secondary schools and colleges	10,764,867	10.5	9.9 – 11.1	4.2	3.8 – 4.6
Other educational services	564,502	10.4	8.0 – 12.7	3.2	2.0 – 4.4
Legal, engineering and other professional services	4,918,120	10.1	9.3 – 11.0	3.4	2.9 – 3.9
Food bakery and dairy stores	2,844,674	10.1	8.9 – 11.3	3.7	2.9 – 4.5
Business services	7,129,982	10.0	9.2 – 10.7	3.7	3.3 – 4.2
Entertainment and recreation services	2,333,724	9.8	8.5 – 11.2	3.9	2.9 – 4.8
Transportation equipment	2,264,491	9.8	8.5 – 11.1	2.9	2.1 – 3.6
Communications	1,922,663	9.7	8.3 – 11.0	3.8	2.9 – 4.6
General merchandise stores	2,288,212	9.7	8.4 – 11.0	3.4	2.6 – 4.2
Other and not specified retail trade	6,383,824	9.5	8.8 – 10.3	3.2	2.8 – 3.7
Hospitals	5,257,550	9.5	8.7 – 10.4	3.8	3.3 – 4.4
Other personal services	3,209,391	9.4	8.4 – 10.5	3.2	2.6 – 3.8
Printing publishing and allied industries	1,624,590	9.3	7.9 – 10.8	3.3	2.4 – 4.2
Public administration	6,197,367	9.3	8.6 – 10.0	3.1	2.7 – 3.5
Automotive dealers and gasoline stations	2,004,364	9.3	7.9 – 10.7	2.9	2.1 – 3.8
Private households	860,021	9.1	7.1 – 11.1	3.4	2.1 – 4.7
Utilities and sanitary	1,410,693	8.9	7.3 – 10.5	2.2	1.4 – 2.9
Insurance, real estate and other finance	5,596,922	8.9	8.1 – 9.7	3.4	2.9 – 3.9
Other transportation	2,922,408	8.6	7.6 – 9.7	3.1	2.4 – 3.7
Chemicals and allied products	1,205,561	8.5	6.8 – 10.2	1.7	1.0 – 2.5
Other and not specified durable goods	2,095,107	8.4	7.2 – 9.7	2.9	2.1 – 3.6
Furniture lumber and wood	1,444,475	8.3	6.7 – 9.9	2.6	1.6 – 3.6
Wholesale trade	4,202,951	8.3	7.4 – 9.2	2.4	1.9 – 2.8
Machinery except electrical	2,034,373	7.9	6.7 – 9.2	2.1	1.4 – 2.8
Trucking service and warehousing	2,493,836	7.7	6.6 – 8.9	2.3	1.6 – 2.9
Other non durable goods	1,529,929	7.7	6.2 – 9.2	1.7	1.1 – 2.4
Fabricated metal industries, including ordnance	1,085,863	7.7	5.9 – 9.4	2.7	1.6 – 3.9
Repair services	1,930,215	7.6	6.2 – 8.9	2.4	1.6 – 3.1
Forestry and fisheries	161,902	7.4	3.0 – 11.7	0.2	0.0 – 0.7
Mining	492,923	7.3	4.7 – 10.0	1.6	0.7 – 2.5
Electrical machinery, equipment and supplies	1,619,529	7.0	5.8 – 8.3	2.1	1.4 – 2.8
Construction	9,135,539	7.0	6.4 – 7.6	1.9	1.6 – 2.2
Agriculture	2,990,283	6.9	5.9 – 8.0	2.1	1.5 – 2.6
Railroads	283,429	6.5	3.4 – 9.6	1.3	0.0 – 3.0
Textile mill and finished textile products	1,189,333	5.7	4.4 – 7.0	1.5	0.8 – 2.2
Primary metal industry	746,402	5.5	3.7 – 7.4	2.6	1.4 – 3.9
Food and kindred products	1,878,810	4.9	4.0 – 5.9	1.1	0.7 – 1.6
Armed forces (excludes Reserves and National Guard)	33,960	4.8	0.0 – 10.4	1.3	0.0 – 3.9
Refused, not ascertained, don't know	4,532,398	5.7	5.0 – 6.3	1.8	1.4 – 2.2
TOTAL	**132,198,813**	**9.1**	**8.9 – 9.3**	**3.2**	**3.1 – 3.3**

NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-9. Asthma: Estimated prevalence by current industry, U.S. male residents age 18 and over, 1997–2004

Industry	Estimated Population	Asthma Prevalence (%)	Asthma 95% Confidence Interval	Asthma Attack in Past 12 Months Prevalence (%)	Asthma Attack in Past 12 Months 95% Confidence Interval
Banking and credit agencies	912,345	10.6	8.4 – 12.8	2.3	1.1 – 3.5
Eating and drinking places	2,714,796	10.0	8.7 – 11.3	3.0	2.2 – 3.8
Legal, engineering and other professional services	2,631,885	9.4	8.2 – 10.6	2.8	2.2 – 3.4
Transportation equipment	1,713,402	9.3	7.7 – 10.8	2.4	1.6 – 3.2
Other personal services	1,162,388	9.3	7.4 – 11.1	2.4	1.5 – 3.4
Elementary and secondary schools and colleges	3,405,089	9.0	8.0 – 10.1	2.5	2.0 – 3.1
Entertainment and recreation services	1,354,252	9.0	7.3 – 10.7	2.3	1.4 – 3.3
Business services	4,082,969	9.0	8.0 – 9.9	3.0	2.4 – 3.6
Machinery except electrical	1,572,963	8.7	7.2 – 10.3	2.3	1.4 – 3.1
Social services, religious and membership organizations	1,278,262	8.7	7.0 – 10.4	2.9	2.0 – 3.8
Health services, except hospitals	1,453,541	8.7	7.1 – 10.3	2.8	1.9 – 3.7
Chemicals and allied products	803,248	8.7	6.5 – 10.8	1.6	0.8 – 2.5
Other educational services	182,072	8.6	4.6 – 12.6	1.8	0.0 – 3.7
Automotive dealers and gasoline stations	1,482,018	8.5	6.8 – 10.3	2.1	1.2 – 3.0
Food bakery and dairy stores	1,330,771	8.5	6.8 – 10.1	2.4	1.5 – 3.4
Utilities and sanitary	1,138,955	8.2	6.5 – 10.0	2.1	1.2 – 3.0
General merchandise stores	818,489	8.2	6.1 – 10.4	1.5	0.6 – 2.4
Hospitals	1,240,188	8.2	6.5 – 9.8	2.1	1.3 – 2.9
Printing publishing and allied industries	944,693	8.2	6.3 – 10.1	2.8	1.6 – 4.0
Public administration	3,402,703	8.1	7.1 – 9.1	1.8	1.4 – 2.3
Other non durable goods	1,116,743	7.8	5.9 – 9.7	1.5	0.7 – 2.2
Other transportation	1,855,755	7.8	6.4 – 9.1	2.2	1.5 – 3.0
Communications	1,134,612	7.8	6.2 – 9.4	2.8	1.8 – 3.8
Other and not specified retail trade	3,062,881	7.7	6.6 – 8.7	2.0	1.5 – 2.5
Furniture lumber and wood	1,094,707	7.7	6.0 – 9.4	1.9	1.0 – 2.8
Wholesale trade	2,998,164	7.5	6.5 – 8.6	1.8	1.3 – 2.3
Other and not specified durable goods	1,396,893	7.5	6.0 – 9.1	2.2	1.3 – 3.2
Insurance, real estate and other finance	2,633,959	7.5	6.4 – 8.6	2.4	1.8 – 3.1
Trucking service and warehousing	2,038,124	7.2	5.9 – 8.5	2.0	1.3 – 2.7
Fabricated metal industries, including ordnance	854,014	7.2	5.2 – 9.1	2.2	1.0 – 3.4
Repair services	1,724,978	7.1	5.7 – 8.5	2.0	1.3 – 2.8
Private households	62,342	6.8	1.3 – 12.3	-	-
Mining	434,376	6.7	3.9 – 9.5	1.2	0.3 – 2.0
Construction	8,286,254	6.6	6.1 – 7.2	1.7	1.4 – 2.0
Electrical machinery, equipment and supplies	1,036,872	6.6	5.1 – 8.2	1.2	0.6 – 1.9
Agriculture	2,304,073	6.3	5.1 – 7.5	1.6	1.0 – 2.2
Forestry and fisheries	126,399	6.0	1.4 – 10.6	-	-
Railroads	262,163	5.8	2.9 – 8.7	0.4	0.0 – 0.9
Primary metal industry	641,803	5.8	3.7 – 7.8	2.6	1.2 – 4.0
Food and kindred products	1,286,490	5.0	3.7 – 6.2	0.9	0.4 – 1.4
Textile mill and finished textile products	552,242	4.9	3.0 – 6.8	0.5	0.0 – 1.0
Armed forces (excludes Reserves and National Guard)	24,397	3.8	0.0 – 9.1	1.8	0.0 – 5.4
Refused, not ascertained, don't know	2,495,210	4.9	4.1 – 5.8	1.4	0.9 – 1.9
TOTAL	**71,048,475**	**7.8**	**7.6 – 8.0**	**2.1**	**2.0 – 2.2**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-10. Asthma: Estimated prevalence by current industry, U.S. female residents age 18 and over, 1997–2004

Industry	Estimated Population	Asthma		Asthma Attack in Past 12 Months	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Railroads	21,267	15.3	0.0 – 34.9	12.0	0.0 – 31.3
Communications	788,051	12.4	10.2 – 14.7	5.1	3.6 – 6.6
Forestry and fisheries	35,503	12.2	1.5 – 22.9	1.0	0.0 – 3.0
Social services, religious and membership organizations	3,513,803	12.1	11.0 – 13.2	5.7	4.9 – 6.6
Mining	58,548	11.9	4.0 – 19.7	5.3	0.7 – 9.8
Utilities and sanitary	271,738	11.7	8.0 – 15.5	2.6	1.0 – 4.1
Eating and drinking places	3,144,746	11.7	10.5 – 12.9	4.8	4.0 – 5.5
Food bakery and dairy stores	1,513,903	11.6	9.9 – 13.3	4.8	3.6 – 6.0
Health services, except hospitals	5,674,117	11.5	10.7 – 12.4	5.1	4.5 – 5.7
Repair services	205,237	11.5	7.2 – 15.8	5.5	2.7 – 8.4
Transportation equipment	551,089	11.5	8.8 – 14.1	4.2	2.5 – 5.9
Automotive dealers and gasoline stations	522,345	11.4	8.7 – 14.1	5.3	3.4 – 7.2
Business services	3,047,013	11.3	10.1 – 12.4	4.7	3.9 – 5.4
Other and not specified retail trade	3,320,943	11.3	10.1 – 12.4	4.4	3.6 – 5.1
Other educational services	382,430	11.2	8.3 – 14.1	3.9	2.3 – 5.5
Elementary and secondary schools and colleges	7,359,777	11.2	10.4 – 11.9	5.0	4.5 – 5.5
Entertainment and recreation services	979,472	11.0	8.9 – 13.2	6.0	4.2 – 7.8
Printing publishing and allied industries	679,897	11.0	8.6 – 13.4	4.0	2.5 – 5.4
Legal, engineering and other professional services	2,286,235	10.9	9.7 – 12.2	4.1	3.3 – 4.9
Public administration	2,794,664	10.8	9.7 – 11.9	4.6	3.9 – 5.4
Banking and credit agencies	1,922,023	10.7	9.3 – 12.1	4.3	3.4 – 5.2
Construction	849,285	10.5	8.3 – 12.7	4.3	2.8 – 5.8
General merchandise stores	1,469,724	10.5	8.8 – 12.1	4.5	3.4 – 5.6
Furniture lumber and wood	349,768	10.3	6.4 – 14.2	4.8	1.9 – 7.8
Other and not specified durable goods	698,214	10.3	8.0 – 12.5	4.1	2.7 – 5.5
Other transportation	1,066,653	10.2	8.4 – 12.0	4.5	3.4 – 5.6
Insurance, real estate and other finance	2,962,964	10.2	9.0 – 11.3	4.3	3.4 – 5.1
Wholesale trade	1,204,787	10.0	8.3 – 11.8	3.8	2.8 – 4.8
Hospitals	4,017,362	10.0	9.0 – 10.9	4.4	3.7 – 5.0
Trucking service and warehousing	455,711	9.9	7.2 – 12.6	3.4	1.8 – 5.1
Fabricated metal industries, including ordnance	231,849	9.5	5.5 – 13.5	4.6	1.6 – 7.5
Other personal services	2,047,003	9.5	8.2 – 10.8	3.6	2.8 – 4.5
Private households	797,679	9.3	7.2 – 11.3	3.7	2.3 – 5.1
Agriculture	686,210	9.1	6.8 – 11.4	3.6	2.2 – 5.0
Chemicals and allied products	402,313	8.2	5.4 – 11.0	2.0	0.5 – 3.4
Electrical machinery, equipment and supplies	582,658	7.8	5.6 – 10.0	3.6	2.0 – 5.3
Armed forces (excludes Reserves and National Guard)	9,563	7.5	0.0 – 21.7	-	-
Other non durable goods	413,186	7.4	5.0 – 9.7	2.4	1.1 – 3.7
Textile mill and finished textile products	637,092	6.5	4.7 – 8.3	2.4	1.2 – 3.5
Machinery except electrical	461,410	5.2	3.4 – 6.9	1.6	0.6 – 2.5
Food and kindred products	592,320	4.9	3.3 – 6.5	1.6	0.6 – 2.6
Primary metal industry	104,600	4.3	0.7 – 7.9	2.6	0.0 – 5.3
Refused, not ascertained, don't know	2,037,188	6.6	5.6 – 7.6	2.3	1.7 – 2.8
TOTAL	**61,150,338**	**10.6**	**10.3 – 10.8**	**4.4**	**4.3 – 4.6**

- No estimates due to no asthma cases or no respondents.
NOTE:See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-11. Asthma: Estimated prevalence by current occupation, U.S. residents age 18 and over, 1997–2004

Occupation	Estimated Population	Asthma Prevalence (%)	Asthma 95% Confidence Interval	Asthma Attack in Past 12 Months Prevalence (%)	Asthma Attack in Past 12 Months 95% Confidence Interval
Health service	2,653,011	11.5	10.3 – 12.7	5.1	4.2 – 6.0
Health technologist and technicians	1,866,864	11.5	10.0 – 13.0	4.8	3.8 – 5.8
Forestry and fishing	156,776	11.4	5.9 – 16.9	1.4	0.0 – 2.8
Other professional specialty	2,951,511	11.2	10.0 – 12.4	3.8	3.2 – 4.5
Personal service	2,761,264	11.1	9.8 – 12.3	4.5	3.7 – 5.3
Teachers, librarians, and counselors	6,945,590	10.9	10.2 – 11.7	4.5	4.0 – 5.0
Food service	5,384,039	10.8	9.8 – 11.7	3.9	3.3 – 4.5
Other administrative support	11,357,068	10.6	10.0 – 11.1	4.1	3.7 – 4.4
Architects and surveyors	230,282	10.5	6.6 – 14.4	3.2	1.1 – 5.4
Financial records processing	2,115,305	10.4	9.0 – 11.9	4.4	3.3 – 5.4
Other sales	6,175,047	10.4	9.6 – 11.2	3.8	3.3 – 4.3
Secretaries, stenographers, and typists	2,683,590	10.4	9.2 – 11.5	4.3	3.6 – 5.1
Writers, artists, entertainers, and athletes	2,321,769	10.3	9.1 – 11.5	3.6	2.8 – 4.3
Health assessment and treating occupations	3,350,709	10.0	8.9 – 11.0	4.4	3.7 – 5.2
Technologist and technicians except health	2,654,392	9.7	8.6 – 10.9	3.4	2.7 – 4.1
Officials and administrators, public administration	778,000	9.6	7.5 – 11.7	3.9	2.7 – 5.2
Other protective service	966,817	9.4	7.6 – 11.2	4.0	2.9 – 5.2
Natural mathematical and computer scientists	2,647,882	9.3	8.2 – 10.4	3.1	2.4 – 3.8
Managers and administrators, except public administration	12,511,135	9.3	8.7 – 9.8	3.2	2.9 – 3.5
Freight, stock and material handlers	3,844,693	9.1	8.0 – 10.2	2.2	1.7 – 2.7
Cleaning and building service	3,095,439	8.9	7.9 – 10.0	3.3	2.6 – 4.0
Management related	5,119,952	8.9	8.1 – 9.7	3.4	2.9 – 3.9
Mail and message distributing	890,721	8.9	6.9 – 10.8	2.8	1.6 – 3.9
Private household	690,863	8.7	6.4 – 10.9	3.1	1.6 – 4.6
Sales representatives, commodities and finance	4,235,862	8.5	7.6 – 9.4	2.8	2.3 – 3.3
Police and firefighters	1,452,583	8.5	6.9 – 10.0	2.2	1.4 – 2.9
Computer equipment operators	378,791	8.4	5.5 – 11.3	3.4	1.5 – 5.2
Supervisors and proprietors	3,863,362	8.2	7.3 – 9.1	2.8	2.2 – 3.3
Engineers	1,987,807	8.0	6.7 – 9.3	2.2	1.5 – 2.9
Health diagnosing	1,060,786	8.0	6.2 – 9.7	3.0	1.9 – 4.2
Motor vehicle operators	4,025,765	7.8	6.9 – 8.6	2.4	1.9 – 2.9
Precision production	3,405,364	7.7	6.7 – 8.6	2.3	1.7 – 2.8
Fabricators, assemblers, inspectors and samplers	2,652,587	7.6	6.5 – 8.6	2.3	1.7 – 2.9
Mechanics and repairers	4,689,178	7.4	6.5 – 8.2	1.9	1.5 – 2.4
Material moving equipment operators	1,180,909	7.2	5.6 – 8.9	1.7	0.8 – 2.5
Machine operators and tenderers, except precision	4,396,288	7.2	6.4 – 8.1	2.1	1.6 – 2.5
Farm workers and other agricultural workers	1,992,139	7.1	5.8 – 8.5	2.0	1.3 – 2.7
Construction and extractive trades	5,829,283	6.4	5.7 – 7.1	1.6	1.3 – 2.0
Other transportation, except motor vehicles	192,922	6.4	2.1 – 10.7	0.4	0.0 – 1.0
Construction laborers	1,065,269	5.7	4.3 – 7.1	1.9	1.1 – 2.7
Farm operators and managers	893,227	5.4	3.7 – 7.1	1.7	0.8 – 2.6
Military	22,962	1.9	0.0 – 5.7	1.9	0.0 – 5.7
Refused, not ascertained, don't know	4,721,015	6.0	5.3 – 6.6	1.8	1.5 – 2.2
TOTAL	**132,198,813**	**9.1**	**8.9 – 9.3**	**3.2**	**3.1 – 3.3**

NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-12. Asthma: Estimated prevalence by current occupation, U.S. male residents age 18 and over, 1997–2004

Occupation	Estimated Population	Asthma		Asthma Attack in Past 12 Months	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Forestry and fishing	151,438	11.3	5.7 – 17.0	1.4	0.0 – 2.9
Architects and surveyors	189,636	11.2	6.6 – 15.8	3.2	0.8 – 5.7
Private household	35,450	11.0	1.1 – 20.9	0.0	-
Other professional specialty	1,498,819	10.7	8.9 – 12.4	2.6	1.8 – 3.4
Computer equipment operators	173,689	10.4	5.3 – 15.6	2.4	0.0 – 5.0
Food service	2,201,759	9.7	8.2 – 11.2	3.0	2.2 – 3.9
Personal service	487,213	9.7	6.8 – 12.6	2.1	0.9 – 3.3
Other administrative support	2,994,472	9.6	8.4 – 10.7	2.7	2.0 – 3.4
Financial records processing	213,438	9.3	5.3 – 13.3	2.5	0.4 – 4.5
Other sales	2,358,262	9.3	7.9 – 10.7	2.4	1.8 – 3.1
Technologist and technicians except health	1,806,343	9.2	7.7 – 10.6	2.6	1.8 – 3.5
Freight, stock and material handlers	2,927,999	9.1	7.9 – 10.4	2.2	1.5 – 2.8
Teachers, librarians, and counselors	2,176,104	9.1	7.8 – 10.3	2.6	1.9 – 3.2
Secretaries, stenographers, and typists	59,874	8.8	1.4 – 16.3	7.5	0.2 – 14.7
Cleaning and building service	1,665,993	8.7	7.2 – 10.3	2.8	1.9 – 3.8
Natural mathematical and computer scientists	1,845,611	8.5	7.1 – 9.9	2.7	1.9 – 3.5
Writers, artists, entertainers, and athletes	1,192,122	8.5	6.9 – 10.1	2.9	1.9 – 3.9
Health service	286,971	8.4	5.3 – 11.4	3.1	1.2 – 5.0
Managers and administrators, except public administration	7,386,680	8.3	7.6 – 9.0	2.3	1.9 – 2.6
Other protective service	700,881	8.2	6.1 – 10.2	3.1	1.9 – 4.4
Management related	2,156,992	8.0	6.8 – 9.2	2.4	1.7 – 3.0
Sales representatives, commodities and finance	2,656,538	8.0	6.8 – 9.1	2.3	1.7 – 2.8
Officials and administrators, public administration	406,991	7.8	4.9 – 10.7	1.6	0.4 – 2.9
Police and firefighters	1,231,087	7.8	6.2 – 9.5	1.7	0.9 – 2.5
Mail and message distributing	515,279	7.7	5.0 – 10.3	2.1	0.7 – 3.6
Engineers	1,783,994	7.5	6.2 – 8.8	1.8	1.1 – 2.5
Fabricators, assemblers, inspectors and samplers	1,652,525	7.5	6.1 – 8.9	1.9	1.2 – 2.6
Health technologist and technicians	373,730	7.3	4.5 – 10.1	2.3	0.8 – 3.8
Precision production	2,591,182	7.2	6.1 – 8.3	1.9	1.3 – 2.5
Mechanics and repairers	4,482,463	7.2	6.3 – 8.0	1.8	1.3 – 2.2
Health assessment and treating occupations	433,914	7.1	4.5 – 9.8	3.1	1.1 – 5.1
Supervisors and proprietors	2,319,783	7.1	6.0 – 8.2	1.7	1.1 – 2.3
Motor vehicle operators	3,515,566	7.1	6.1 – 8.0	2.0	1.5 – 2.5
Material moving equipment operators	1,103,958	7.0	5.3 – 8.7	1.6	0.7 – 2.4
Health diagnosing	763,693	7.0	5.0 – 9.0	2.5	1.2 – 3.7
Machine operators and tenderers, except precision	2,912,854	6.8	5.7 – 7.8	1.8	1.3 – 2.3
Farm workers and other agricultural workers	1,622,902	6.7	5.2 – 8.2	1.6	0.9 – 2.3
Other transportation, except motor vehicles	188,622	6.4	2.0 – 10.8	0.3	0.0 – 0.8
Construction and extractive trades	5,674,441	6.3	5.6 – 7.0	1.5	1.2 – 1.9
Farm operators and managers	738,134	5.8	3.9 – 7.7	1.5	0.5 – 2.5
Construction laborers	1,038,707	5.7	4.2 – 7.1	1.8	1.0 – 2.6
Military	16,561	2.7	0.0 – 8.0	2.7	0.0 – 8.0
Refused, not ascertained, don't know	2,515,809	5.0	4.1 – 5.8	1.3	0.8 – 1.8
TOTAL	**71,048,475**	**7.8**	**7.6 – 8.0**	**2.1**	**2.0 – 2.2**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-13. Asthma: Estimated prevalence by current occupation, U.S. female residents age 18 and over, 1997–2004

Occupation	Estimated Population	Asthma		Asthma Attack in Past 12 Months	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Forestry and fishing	5,338	13.6	0.0 – 38.3	-	-
Other protective service	265,936	12.6	8.8 – 16.4	6.4	3.7 – 9.1
Health technologist and technicians	1,493,134	12.5	10.8 – 14.3	5.5	4.3 – 6.6
Motor vehicle operators	510,199	12.5	9.8 – 15.3	5.1	3.3 – 6.8
Writers, artists, entertainers, and athletes	1,129,647	12.2	10.4 – 14.1	4.3	3.2 – 5.4
Police and firefighters	221,496	12.2	7.8 – 16.5	4.7	1.9 – 7.6
Engineers	203,813	12.0	7.3 – 16.8	5.7	2.6 – 8.8
Health service	2,366,040	11.9	10.6 – 13.2	5.3	4.4 – 6.3
Teachers, librarians, and counselors	4,769,485	11.8	10.9 – 12.7	5.3	4.7 – 6.0
Other professional specialty	1,452,692	11.8	10.2 – 13.4	5.1	4.0 – 6.2
Mechanics and repairers	206,714	11.6	7.2 – 16.0	5.7	2.7 – 8.8
Food service	3,182,280	11.5	10.3 – 12.7	4.5	3.8 – 5.3
Officials and administrators, public administration	371,010	11.5	8.4 – 14.5	6.5	4.2 – 8.8
Personal service	2,274,051	11.4	10.0 – 12.8	5.0	4.1 – 6.0
Natural mathematical and computer scientists	802,272	11.1	9.1 – 13.1	4.1	2.8 – 5.3
Other sales	3,816,785	11.1	10.0 – 12.1	4.6	3.9 – 5.3
Material moving equipment operators	76,951	11.1	3.7 – 18.4	2.7	0.0 – 5.7
Technologist and technicians except health	848,049	11.0	9.0 – 13.0	4.9	3.5 – 6.2
Other administrative support	8,362,596	10.9	10.2 – 11.6	4.6	4.1 – 5.0
Managers and administrators, except public administration	5,124,455	10.7	9.8 – 11.5	4.6	4.0 – 5.2
Financial records processing	1,901,868	10.5	9.0 – 12.1	4.6	3.4 – 5.8
Construction and extractive trades	154,843	10.5	5.5 – 15.5	4.1	0.7 – 7.5
Health diagnosing	297,093	10.5	6.8 – 14.1	4.4	1.9 – 7.0
Mail and message distributing	375,442	10.5	7.5 – 13.4	3.6	1.9 – 5.4
Health assessment and treating occupations	2,916,795	10.4	9.3 – 11.5	4.7	3.9 – 5.4
Secretaries, stenographers, and typists	2,623,716	10.4	9.2 – 11.6	4.3	3.5 – 5.1
Supervisors and proprietors	1,543,579	9.8	8.3 – 11.2	4.4	3.4 – 5.4
Management related	2,962,961	9.5	8.5 – 10.6	4.2	3.5 – 4.9
Sales representatives, commodities and finance	1,579,324	9.5	8.0 – 10.9	3.7	2.8 – 4.6
Cleaning and building service	1,429,446	9.1	7.7 – 10.6	3.9	3.0 – 4.9
Precision production	814,181	9.1	6.9 – 11.2	3.5	2.3 – 4.8
Freight, stock and material handlers	916,695	9.1	7.1 – 11.0	2.4	1.5 – 3.3
Farm workers and other agricultural workers	369,236	8.9	5.8 – 11.9	3.7	1.7 – 5.8
Private household	655,413	8.6	6.3 – 10.9	3.3	1.7 – 4.8
Machine operators and tenderers, except precision	1,483,434	8.1	6.7 – 9.6	2.6	1.7 – 3.5
Fabricators, assemblers, inspectors and samplers	1,000,062	7.7	6.1 – 9.3	3.1	2.0 – 4.1
Architects and surveyors	40,646	7.2	0.8 – 13.6	3.2	0.0 – 7.8
Construction laborers	26,562	7.0	0.0 – 16.7	6.5	0.0 – 16.2
Computer equipment operators	205,102	6.7	3.5 – 9.8	4.2	1.5 – 6.9
Other transportation, except motor vehicles	4,300	5.4	0.0 – 16.2	5.4	0.0 – 16.2
Farm operators and managers	155,093	3.6	0.9 – 6.3	2.5	0.3 – 4.7
Military	6,401	0.0	0.0 – 0.0	0.0	0.0 – 0.0
Refused, not ascertained, don't know	2,205,205	7.1	6.1 – 8.1	2.5	1.9 – 3.1
TOTAL	**61,150,338**	**10.6**	**10.3 – 10.8**	**4.4**	**4.3 – 4.6**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-14 (page 1 of 2). Asthma: Estimated prevalence by current industry and smoking status, U.S. residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Health services, except hospitals	4,220,811	9.8	8.9 – 10.8	1,326,263	12.1	10.3 – 13.9	1,544,324	12.9	11.2 – 14.5
Eating and drinking places	2,885,257	10.5	9.2 – 11.8	695,747	9.3	6.9 – 11.6	2,249,022	12.1	10.7 – 13.5
Food, bakery and dairy stores	1,526,023	9.2	7.6 – 10.8	446,161	10.2	7.4 – 13.0	861,100	11.9	9.6 – 14.2
General merchandise stores	1,338,543	8.0	6.4 – 9.5	378,149	12.7	8.9 – 16.4	564,335	11.8	9.0 – 14.6
Private households	543,221	6.4	4.4 – 8.3	136,039	16.9	10.1 – 23.7	177,152	11.5	6.4 – 16.7
Social services, religious and membership organizations	2,926,783	11.2	10.0 – 12.4	997,132	10.8	8.9 – 12.8	855,931	11.3	9.2 – 13.4
Business services	3,964,486	8.9	8.0 – 9.9	1,364,284	11.6	9.8 – 13.4	1,768,271	11.0	9.6 – 12.5
Other and not specified retail trade	3,589,002	9.1	8.0 – 10.1	1,241,884	9.9	8.1 – 11.6	1,529,268	10.4	8.8 – 12.0
Other personal services	1,674,915	8.7	7.2 – 10.1	607,166	10.4	7.8 – 13.0	913,108	10.3	8.3 – 12.4
Banking and credit agencies	1,774,282	10.7	9.2 – 12.3	504,815	11.5	8.6 – 14.5	546,012	10.0	7.6 – 12.5
Other transportation	1,520,149	7.5	6.1 – 8.9	709,055	10.1	7.7 – 12.5	677,128	9.8	7.5 – 12.2
Legal, engineering and other professional services	3,005,822	10.0	8.9 – 11.1	1,097,872	10.6	8.8 – 12.5	792,489	9.8	7.8 – 11.8
Hospitals	3,323,384	8.7	7.7 – 9.6	1,009,095	12.6	10.5 – 14.7	905,288	9.5	7.6 – 11.5
Communications	1,104,050	9.7	8.0 – 11.5	390,827	9.9	7.0 – 12.8	422,291	9.4	6.6 – 12.2
Automotive dealers and gasoline stations	921,072	9.7	7.5 – 11.9	397,469	8.6	5.5 – 11.7	673,875	9.3	6.8 – 11.8
Elementary and secondary schools and colleges	7,396,700	10.4	9.6 – 11.1	2,004,792	11.8	10.3 – 13.2	1,330,738	9.2	7.6 – 10.7
Public administration	3,573,316	9.1	8.1 – 10.0	1,406,952	10.0	8.4 – 11.6	1,187,671	9.2	7.6 – 10.8
Transportation equipment	1,107,459	10.6	8.6 – 12.7	556,899	9.0	6.4 – 11.5	597,209	9.1	6.8 – 11.4
Other nondurable goods	705,306	6.4	4.5 – 8.2	367,915	8.6	4.9 – 12.3	452,834	9.1	6.1 – 12.0
Other and not specified durable goods	1,104,659	7.7	6.0 – 9.5	449,663	9.7	6.8 – 12.6	534,616	9.0	6.5 – 11.4
Other educational services	349,521	9.7	6.8 – 12.6	137,436	12.5	7.2 – 17.7	76,686	8.6	3.0 – 14.3
Insurance, real estate and other finance	3,170,966	9.0	7.9 – 10.1	1,247,369	8.8	7.2 – 10.4	1,155,766	8.5	7.0 – 10.1
Furniture, lumber and wood	687,181	7.9	5.6 – 10.2	273,128	9.2	5.7 – 12.7	477,650	8.5	5.6 – 11.4
Trucking service and warehousing	1,197,822	7.6	5.9 – 9.3	494,129	6.8	4.4 – 9.2	789,818	8.5	6.5 – 10.5
Entertainment and recreation services	1,374,662	9.3	7.5 – 11.1	437,711	13.4	10.0 – 16.8	517,506	8.4	6.0 – 10.8
Repair services	774,323	7.4	5.4 – 9.4	442,147	6.9	4.1 – 9.6	697,805	8.3	6.0 – 10.6
Chemicals and allied products	681,276	8.9	6.6 – 11.2	266,746	7.9	4.4 – 11.4	252,556	8.3	4.5 – 12.1
Utilities and sanitary	732,957	9.0	6.8 – 11.1	338,062	10.0	6.7 – 13.3	333,258	7.9	4.6 – 11.2

See footnotes at end of table.

Table 9-14 (page 2 of 2). Asthma: Estimated prevalence by current industry and smoking status, U.S. residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Fabricated metal industries, including ordnance	459,245	7.3	4.8 – 9.8	256,876	8.1	4.0 – 12.1	369,407	7.9	4.9 – 10.8
Armed forces (excludes Reserves and National Guard)	19,585	6.1	0.0 – 14.6	8,740	-	-	5,636	7.8	0.0 – 23.3
Agriculture	1,692,103	6.4	5.0 – 7.8	570,676	7.1	5.0 – 9.3	711,949	7.4	5.2 – 9.6
Printing publishing and allied industries	818,225	10.0	7.8 – 12.2	371,680	10.3	7.0 – 13.5	433,901	7.4	5.0 – 9.9
Electrical machinery, equipment and supplies	915,210	7.2	5.6 – 8.8	312,445	6.3	3.3 – 9.3	388,785	7.3	4.7 – 10.0
Machinery, except electrical	1,012,010	7.1	5.5 – 8.8	465,639	10.8	7.5 – 14.0	548,260	7.2	4.9 – 9.4
Construction	3,987,779	6.4	5.6 – 7.2	1,804,630	8.2	6.8 – 9.6	3,296,357	7.2	6.2 – 8.1
Wholesale trade	2,137,212	7.8	6.6 – 9.1	952,149	10.9	8.7 – 13.0	1,089,183	7.0	5.4 – 8.6
Primary metal industry	326,480	4.3	2.0 – 6.6	169,513	6.1	2.1 – 10.0	247,279	6.9	3.1 – 10.7
Food and kindred products	963,813	4.2	3.0 – 5.4	368,240	4.2	2.2 – 6.2	541,573	6.8	4.6 – 9.1
Mining	238,721	8.7	4.5 – 12.9	89,919	4.8	0.9 – 8.7	163,413	6.7	2.2 – 11.2
Textile mill and finished textile products	668,322	5.6	3.9 – 7.3	188,813	6.8	3.0 – 10.5	325,896	5.5	3.2 – 7.8
Railroads	123,505	7.3	1.8 – 12.8	76,471	5.8	0.8 – 10.7	79,725	5.4	0.7 – 10.1
Forestry and fisheries	81,726	8.0	1.9 – 14.1	42,998	9.4	0.0 – 19.7	36,539	3.7	0.0 – 9.0
Refused, not ascertained, don't know	2,714,759	5.3	4.4 – 6.1	556,268	8.0	5.7 – 10.3	744,936	7.3	5.5 – 9.0
TOTAL	**73,332,639**	**8.7**	**8.5 – 9.0**	**25,959,959**	**10.0**	**9.6 – 10.4**	**31,866,543**	**9.3**	**9.0 – 9.6**

- No estimates due to no asthma cases or no respondents.
NOTE:See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-15 (page 1 of 2). Asthma: Estimated prevalence by current industry and smoking status, U.S. male residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Banking and credit agencies	532,216	12.1	8.9 – 15.3	193,417	10.9	6.3 – 15.5	182,624	6.3	2.9 – 9.7
Transportation equipment	821,006	10.4	8.0 – 12.9	449,922	9.1	6.1 – 12.0	439,923	7.3	4.8 – 9.8
Legal, engineering and other professional services	1,591,163	9.8	8.2 – 11.3	641,856	9.3	6.9 – 11.6	387,374	8.5	5.5 – 11.4
Chemicals and allied products	438,417	9.8	6.7 – 12.8	195,022	9.1	4.6 – 13.6	165,918	5.4	1.7 – 9.1
Eating and drinking places	1,352,606	9.7	7.8 – 11.6	333,229	9.6	5.9 – 13.3	1,010,197	10.8	8.6 – 12.9
Elementary and secondary schools and colleges	2,224,341	9.6	8.3 – 10.9	711,146	8.3	6.2 – 10.4	457,917	7.5	5.1 – 9.8
Printing publishing and allied industries	436,865	9.4	6.2 – 12.5	227,159	7.7	4.3 – 11.2	280,669	6.6	3.6 – 9.5
Other personal services	520,249	8.7	6.0 – 11.4	268,906	9.1	5.2 – 13.1	367,235	10.2	6.9 – 13.6
Food, bakery and dairy stores	724,506	8.7	6.4 – 11.1	237,988	7.8	4.5 – 11.0	360,656	8.5	5.2 – 11.9
Automotive dealers and gasoline stations	683,611	8.7	6.2 – 11.2	322,278	8.6	5.0 – 12.2	467,205	8.4	5.4 – 11.5
Other educational services	91,214	8.7	3.0 – 14.4	58,862	10.6	2.9 – 18.2	31,996	4.9	0.0 – 11.9
Social services, religious and membership organizations	719,760	8.6	6.4 – 10.7	340,194	9.2	5.9 – 12.5	213,433	8.4	4.1 – 12.7
Mining	204,301	8.6	4.0 – 13.3	80,906	3.9	0.0 – 8.0	148,298	5.7	1.1 – 10.2
Entertainment and recreation services	796,115	8.5	6.2 – 10.7	251,642	13.0	8.5 – 17.5	305,929	7.1	4.1 – 10.1
Communications	629,337	8.5	6.2 – 10.8	250,610	6.6	3.5 – 9.6	252,357	7.1	3.9 – 10.3
Business services	2,223,188	8.4	7.2 – 9.7	834,921	10.1	7.8 – 12.3	1,002,209	9.4	7.6 – 11.3
Health services, except hospitals	897,406	8.3	6.3 – 10.2	320,868	9.0	5.3 – 12.7	230,733	9.7	5.8 – 13.6
Machinery, except electrical	749,288	8.2	6.1 – 10.3	380,228	10.8	7.0 – 14.5	437,389	8.0	5.3 – 10.7
Utilities and sanitary	581,915	8.2	5.8 – 10.5	281,922	9.8	6.1 – 13.5	271,018	6.9	3.2 – 10.6
Wholesale trade	1,436,034	7.9	6.3 – 9.5	735,735	9.1	6.8 – 11.4	804,606	5.7	4.0 – 7.4
Public administration	1,913,141	7.7	6.4 – 8.9	876,657	9.3	7.1 – 11.4	593,863	7.9	5.7 – 10.1
Insurance, real estate and other finance	1,449,079	7.7	6.1 – 9.2	673,128	7.6	5.4 – 9.8	501,032	6.8	4.5 – 9.1
Other and not specified retail trade	1,627,075	7.5	6.1 – 9.0	646,741	7.3	5.2 – 9.4	775,766	8.4	6.3 – 10.6
Trucking service and warehousing	954,496	7.5	5.4 – 9.5	427,023	6.5	3.9 – 9.1	646,785	7.3	5.2 – 9.5
Forestry and fisheries	60,105	7.5	0.1 – 14.8	33,924	5.1	0.0 – 14.8	31,731	4.3	0.0 – 10.4
Electrical machinery, equipment and supplies	586,945	7.2	5.1 – 9.3	212,249	5.0	1.9 – 8.2	235,722	6.8	3.4 – 10.1
General merchandise stores	441,285	7.0	4.3 – 9.7	171,617	6.7	2.6 – 10.7	203,243	12.3	7.1 – 17.6
Repair services	664,515	7.0	4.9 – 9.2	411,488	6.6	3.7 – 9.4	634,585	7.6	5.2 – 10.0

See footnotes at end of table.

Table 9-15 (page 2 of 2). Asthma: Estimated prevalence by current industry and smoking status, U.S. male residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Hospitals	751,433	6.8	4.8 – 8.8	278,750	11.9	7.8 – 15.9	204,907	8.3	4.4 – 12.1
Other and not specified durable goods	694,378	6.8	4.7 – 8.9	323,603	8.5	5.1 – 12.0	373,867	8.2	5.2 – 11.2
Furniture, lumber and wood	488,909	6.8	4.4 – 9.3	225,719	9.8	5.9 – 13.7	373,564	7.6	4.5 – 10.7
Other transportation	897,513	6.7	4.9 – 8.6	502,733	8.0	5.3 – 10.7	447,574	9.7	6.7 – 12.7
Other nondurable goods	494,180	6.6	4.2 – 9.0	300,751	8.1	3.8 – 12.3	320,082	9.5	5.9 – 13.2
Fabricated metal industries, including ordnance	350,276	6.5	3.9 – 9.2	207,868	8.6	3.8 – 13.3	295,535	6.9	3.8 – 10.0
Construction	3,555,816	6.2	5.3 – 7.0	1,649,806	7.1	5.8 – 8.5	3,041,470	7.0	6.0 – 7.9
Private households	28,358	6.1	0.1 – 12.1	8,885	11.0	0.0 – 31.0	25,100	6.1	0.0 – 15.4
Agriculture	1,267,735	6.1	4.4 – 7.8	461,568	7.0	4.6 – 9.4	560,650	5.4	3.3 – 7.4
Railroads	111,392	6.0	1.2 – 10.8	72,740	6.1	0.9 – 11.2	74,998	5.5	0.5 – 10.4
Textile mill and finished textile products	265,252	5.2	2.3 – 8.0	120,345	5.9	1.6 – 10.2	161,601	3.9	0.8 – 7.0
Primary metal industry	280,072	4.1	1.7 – 6.5	145,923	7.0	2.5 – 11.6	212,678	7.2	2.9 – 11.4
Food and kindred products	608,220	4.0	2.5 – 5.6	286,064	3.5	1.5 – 5.5	387,603	7.5	4.6 – 10.4
Armed forces (excludes Reserves and National Guard)	14,026	3.4	0.0 – 10.2	7,154	-	-	3,218	13.7	0.0 – 40.7
Refused, not ascertained, don't know	1,381,928	4.5	3.4 – 5.7	352,362	6.4	3.6 – 9.2	446,928	6.4	4.2 – 8.6
TOTAL	**36,539,662**	**7.8**	**7.5 – 8.1**	**15,513,906**	**8.3**	**7.8 – 8.8**	**18,370,185**	**7.7**	**7.3 – 8.1**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-16 (page 1 of 2). Asthma: Estimated prevalence by current industry and smoking status, U.S. female residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Railroads	12,112	19.1	0.0 – 50.5	3,731	-	-	4,727	4.9	0.0 – 14.6
Armed forces (excludes Reserves and National Guard)	5,559	12.9	0.0 – 36.5	1,586	-	-	2,418	-	-
Automotive dealers and gasoline stations	237,462	12.6	8.2 – 17.0	75,192	8.7	3.3 – 14.1	206,670	11.3	7.2 – 15.4
Social services, religious and membership organizations	2,207,023	12.1	10.6 – 13.5	656,938	11.7	9.3 – 14.1	642,498	12.3	9.9 – 14.7
Utilities and sanitary	151,042	12.0	6.7 – 17.3	56,140	10.8	3.5 – 18.2	62,240	12.4	5.2 – 19.5
Communications	474,713	11.3	8.6 – 14.1	140,216	15.9	10.1 – 21.8	169,933	12.8	7.8 – 17.9
Transportation equipment	286,453	11.2	7.4 – 15.0	106,977	8.5	3.5 – 13.4	157,287	14.1	8.9 – 19.2
Eating and drinking places	1,532,651	11.2	9.4 – 13.0	362,518	9.0	6.0 – 12.0	1,238,825	13.2	11.3 – 15.1
Public administration	1,660,175	10.7	9.3 – 12.2	530,295	11.2	8.7 – 13.7	593,808	10.5	8.1 – 12.9
Elementary and secondary schools and colleges	5,172,360	10.7	9.8 – 11.5	1,293,646	13.7	11.8 – 15.6	872,821	10.1	8.0 – 12.1
Printing publishing and allied industries	381,360	10.6	7.6 – 13.6	144,521	14.3	8.1 – 20.4	153,233	9.0	4.6 – 13.3
Furniture, lumber and wood	198,272	10.5	5.2 – 15.8	47,409	6.4	0.0 – 14.2	104,087	11.6	4.2 – 18.9
Other and not specified retail trade	1,961,927	10.4	8.9 – 11.8	595,143	12.7	9.8 – 15.5	753,502	12.4	10.0 – 14.8
Entertainment and recreation services	578,547	10.4	7.5 – 13.3	186,070	14.0	8.9 – 19.1	211,577	10.3	6.4 – 14.1
Health services, except hospitals	3,323,405	10.3	9.2 – 11.3	1,005,395	13.1	11.0 – 15.1	1,313,591	13.4	11.6 – 15.3
Legal, engineering and other professional services	1,414,660	10.3	8.7 – 11.9	456,017	12.6	9.5 – 15.6	405,115	11.1	8.3 – 13.9
Insurance, real estate and other finance	1,721,887	10.2	8.6 – 11.7	574,241	10.3	7.9 – 12.6	654,735	9.9	7.7 – 12.0
Banking and credit agencies	1,242,065	10.1	8.4 – 11.9	311,398	11.9	8.2 – 15.7	363,388	11.9	8.7 – 15.2
Other educational services	258,307	10.0	6.7 – 13.4	78,574	13.9	6.7 – 21.0	44,690	11.3	3.1 – 19.5
Fabricated metal industries, including ordnance	108,970	9.7	3.9 – 15.6	49,008	6.0	0.0 – 12.3	73,872	11.6	3.6 – 19.7
Repair services	109,808	9.6	4.0 – 15.2	30,659	10.8	0.9 – 20.7	63,220	15.5	6.9 – 24.0
Food, bakery and dairy stores	801,517	9.6	7.4 – 11.9	208,173	13.0	8.2 – 17.8	500,444	14.3	11.1 – 17.4
Business services	1,741,298	9.6	8.2 – 11.0	529,363	14.0	11.2 – 16.9	766,061	13.1	10.7 – 15.5
Mining	34,420	9.4	0.0 – 18.9	9,012	12.6	0.0 – 27.5	15,115	17.1	0.0 – 36.1
Other and not specified durable goods	410,281	9.4	6.4 – 12.3	126,059	12.7	7.4 – 18.1	160,749	10.8	6.4 – 15.2
Forestry and fisheries	21,621	9.3	0.0 – 20.1	9,074	25.4	0.0 – 55.8	4,808	-	-
Hospitals	2,571,951	9.2	8.1 – 10.3	730,345	12.9	10.5 – 15.4	700,381	9.9	7.7 – 12.2
Other personal services	1,154,666	8.6	7.0 – 10.3	338,260	11.4	8.0 – 14.8	545,874	10.4	7.9 – 12.9

See footnotes at end of table.

Table 9-16 (page 2 of 2). Asthma: Estimated prevalence by current industry and smoking status, U.S. female residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Other transportation	622,636	8.6	6.4 – 10.8	206,322	15.2	10.4 – 20.0	229,554	10.2	6.3 – 14.0
General merchandise stores	897,258	8.5	6.6 – 10.3	206,532	17.7	11.9 – 23.5	361,092	11.5	8.2 – 14.8
Construction	431,963	8.3	5.5 – 11.1	154,824	19.0	12.0 – 26.1	254,887	9.5	6.1 – 12.9
Trucking service and warehousing	243,326	8.2	4.9 – 11.4	67,106	8.8	2.7 – 14.9	143,033	13.6	7.9 – 19.3
Wholesale trade	701,178	7.7	5.8 – 9.6	216,414	16.7	11.6 – 21.9	284,577	10.8	6.9 – 14.6
Agriculture	424,368	7.4	4.9 – 9.9	109,108	7.7	2.6 – 12.8	151,299	15.1	8.5 – 21.8
Chemicals and allied products	242,859	7.3	4.0 – 10.6	71,724	4.7	0.0 – 9.3	86,638	13.8	5.6 – 22.1
Electrical machinery, equipment and supplies	328,265	7.3	4.6 – 9.9	100,196	9.0	2.5 – 15.4	153,063	8.1	3.9 – 12.4
Private households	514,863	6.4	4.4 – 8.4	127,154	17.3	10.2 – 24.5	152,052	12.4	6.7 – 18.2
Textile mill and finished textile products	403,070	5.9	3.7 – 8.1	68,468	8.3	1.5 – 15.1	164,295	7.1	3.6 – 10.5
Other nondurable goods	211,125	5.8	3.1 – 8.6	67,164	11.2	4.3 – 18.1	132,752	8.0	3.2 – 12.8
Primary metal industry	46,408	5.6	0.0 – 11.9	23,590	-	-	34,601	5.5	0.0 – 12.1
Food and kindred products	355,593	4.4	2.4 – 6.4	82,176	6.5	1.2 – 11.9	153,969	5.2	2.2 – 8.2
Machinery, except electrical	262,722	3.9	1.9 – 5.8	85,411	10.7	4.5 – 17.0	110,871	4.0	1.0 – 7.1
Refused, not ascertained, don't know	1,332,832	6.0	4.8 – 7.3	203,906	10.7	6.8 – 14.6	298,008	8.6	5.7 – 11.5
TOTAL	**36,792,977**	**9.7**	**9.4 – 10.0**	**10,446,053**	**12.5**	**11.8 – 13.1**	**13,496,359**	**11.5**	**10.9 – 12.0**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-17 (page 1 of 2). Asthma: Estimated prevalence by current occupation and smoking status, U.S. residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Forestry and fishing	62,234	12.6	3.8 – 21.4	32,761	10.8	0.0 – 22.7	60,530	10.8	1.7 – 19.8
Other professional specialty	1,838,285	11.6	10.0 – 13.1	746,664	10.7	8.4 – 13.0	353,436	10.2	7.1 – 13.3
Teachers, librarians, and counselors	4,947,395	10.8	9.9 – 11.7	1,264,637	12.6	10.8 – 14.4	714,610	8.9	6.8 – 10.9
Personal service	1,668,368	10.7	9.1 – 12.3	504,559	13.0	9.9 – 16.1	574,309	10.6	8.0 – 13.2
Financial records processing	1,225,524	10.5	8.4 – 12.5	407,538	10.3	7.4 – 13.2	471,378	10.0	7.5 – 12.4
Health technologist and technicians	1,118,460	10.2	8.3 – 12.1	331,759	12.8	9.1 – 16.5	411,523	14.0	10.7 – 17.4
Other administrative support	6,749,991	10.0	9.2 – 10.8	1,993,188	11.4	10.0 – 12.8	2,565,801	11.5	10.2 – 12.8
Food service	2,637,410	9.8	8.5 – 11.2	661,352	10.9	8.3 – 13.5	2,065,809	12.0	10.5 – 13.5
Other sales	3,500,758	9.6	8.5 – 10.7	996,598	10.2	8.2 – 12.2	1,649,426	12.4	10.7 – 14.1
Architects and surveyors	139,408	9.6	4.9 – 14.2	59,655	12.3	4.1 – 20.5	30,361	11.6	0.0 – 24.9
Technologist and technicians except health	1,565,082	9.5	8.0 – 11.1	550,089	9.6	7.0 – 12.3	530,464	10.5	7.8 – 13.2
Managers and administrators, except public administration	6,738,014	9.5	8.8 – 10.2	2,991,984	9.5	8.3 – 10.6	2,735,593	8.5	7.5 – 9.5
Writers, artists, entertainers, and athletes	1,375,809	9.4	7.9 – 10.9	530,710	12.2	9.4 – 15.0	409,918	10.8	7.7 – 13.8
Health assessment and treating occupations	2,158,095	9.4	8.2 – 10.6	714,893	12.0	9.5 – 14.5	460,559	9.8	6.9 – 12.6
Natural mathematical and computer scientists	1,724,794	9.4	8.0 – 10.8	558,856	9.4	6.8 – 12.1	354,239	8.7	5.8 – 11.6
Other protective service	482,828	9.3	6.6 – 12.0	202,840	8.5	4.8 – 12.3	276,970	10.3	6.9 – 13.6
Officials and administrators, public administration	431,561	9.2	6.6 – 11.9	227,573	10.8	6.3 – 15.2	116,922	8.6	3.8 – 13.4
Health service	1,478,898	9.0	7.5 – 10.5	388,825	13.0	9.8 – 16.2	771,352	15.5	13.0 – 18.0
Secretaries, stenographers, and typists	1,646,141	9.0	7.6 – 10.4	510,767	14.4	11.2 – 17.6	520,023	10.7	8.0 – 13.4
Freight, stock and material handlers	2,073,394	8.8	7.4 – 10.3	514,471	10.5	7.5 – 13.5	1,237,022	9.1	7.2 – 10.9
Police and firefighters	883,103	8.7	6.6 – 10.7	296,303	8.7	5.1 – 12.3	264,605	7.6	4.5 – 10.7
Management related	3,080,545	8.6	7.6 – 9.6	1,090,030	10.4	8.6 – 12.2	942,661	8.0	6.3 – 9.7
Supervisors and proprietors	1,998,764	8.6	7.3 – 9.9	864,310	8.3	6.4 – 10.2	983,403	7.3	5.8 – 8.9
Cleaning and building service	1,626,735	8.5	6.9 – 10.0	537,007	9.9	7.4 – 12.3	913,407	9.4	7.5 – 11.2
Sales representatives, commodities and finance	2,331,585	8.0	6.8 – 9.2	1,036,688	9.2	7.3 – 11.0	851,895	9.1	7.0 – 11.1
Engineers	1,318,553	8.0	6.4 – 9.6	417,266	7.3	4.6 – 10.0	248,887	8.9	5.3 – 12.4
Computer equipment operators	232,805	8.0	4.1 – 11.9	68,947	9.8	3.1 – 16.5	72,501	8.8	2.8 – 14.9
Health diagnosing	791,649	8.0	6.0 – 10.0	211,441	8.9	4.6 – 13.1	54,515	4.2	0.0 – 12.1

See footnotes at end of table.

Table 9-17 (page 2 of 2). Asthma: Estimated prevalence by current occupation and smoking status, U.S. residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Motor vehicle operators	1,714,208	7.7	6.3 – 9.1	920,386	8.3	6.4 – 10.1	1,366,656	7.5	6.0 – 9.0
Mail and message distributing	460,542	7.5	4.9 – 10.1	220,229	9.8	5.8 – 13.7	208,084	10.9	6.4 – 15.4
Mechanics and repairers	1,986,208	6.8	5.6 – 8.0	1,186,984	8.2	6.4 – 10.0	1,495,345	7.5	6.1 – 9.0
Precision production	1,516,041	6.7	5.4 – 8.0	809,275	8.6	6.4 – 10.9	1,065,793	8.5	6.6 – 10.3
Machine operators and tenderers, except precision	2,114,395	6.3	5.2 – 7.3	783,434	8.6	6.1 – 11.1	1,486,562	7.9	6.5 – 9.3
Fabricators, assemblers, inspectors and samplers	1,312,728	6.2	4.8 – 7.6	485,050	10.2	7.4 – 13.0	847,577	8.3	6.3 – 10.3
Farm operators and managers	543,609	6.0	3.6 – 8.4	209,737	5.6	2.7 – 8.4	136,582	2.0	0.0 – 4.1
Private household	447,662	5.9	3.8 – 8.0	110,594	16.8	8.9 – 24.7	130,476	11.4	5.2 – 17.6
Material moving equipment operators	497,904	5.9	3.8 – 8.0	257,695	7.1	3.4 – 10.7	415,126	9.2	6.0 – 12.3
Construction and extractive trades	2,446,680	5.9	4.9 – 6.9	1,102,800	7.8	6.1 – 9.5	2,252,697	6.3	5.2 – 7.4
Farm workers and other agricultural workers	1,060,580	5.8	4.0 – 7.6	331,277	8.7	5.1 – 12.2	585,259	8.2	5.8 – 10.6
Construction laborers	491,231	5.4	3.3 – 7.5	170,385	5.2	1.7 – 8.6	392,515	6.5	4.2 – 8.9
Other transportation, except motor vehicles	85,616	3.8	0.0 – 9.0	52,319	2.9	0.0 – 6.2	54,987	13.8	2.0 – 25.6
Military	10,579	-	-	7,194	-	-	5,189	8.5	0.0 – 25.4
Refused, not ascertained, don't know	2,818,468	5.4	4.6 – 6.3	600,891	9.6	7.2 – 12.0	781,580	7.0	5.3 – 8.7
TOTAL	**73,332,639**	**8.7**	**8.5 – 9.0**	**25,959,959**	**10.0**	**9.6 – 10.4**	**31,866,543**	**9.3**	**9.0 – 9.6**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-18 (page 1 of 2). Asthma: Estimated prevalence by current occupation and smoking status, U.S. male residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Forestry and fishing	59,586	11.9	3.0 – 20.8	30,892	11.4	0.0 – 24.1	59,709	10.9	1.8 – 20.1
Other professional specialty	928,578	11.0	8.7 – 13.4	415,843	9.6	6.6 – 12.7	147,738	10.9	5.3 – 16.5
Personal service	262,401	11.0	6.9 – 15.1	107,086	8.2	2.5 – 13.8	113,402	8.5	2.6 – 14.4
Financial records processing	126,989	10.8	5.1 – 16.5	36,289	6.0	0.0 – 12.8	47,428	8.4	0.6 – 16.2
Computer equipment operators	105,046	10.7	3.7 – 17.6	34,679	10.1	0.0 – 21.3	29,427	11.6	0.7 – 22.5
Private household	16,639	10.6	0.0 – 23.0	6,273	15.5	0.0 – 43.6	12,539	9.3	0.0 – 26.8
Architects and surveyors	106,282	9.8	4.2 – 15.3	55,679	13.2	4.4 – 21.9	26,818	13.1	0.0 – 28.0
Other administrative support	1,643,610	9.7	8.0 – 11.3	602,798	9.2	6.9 – 11.6	738,629	9.7	7.5 – 12.0
Cleaning and building service	770,123	9.4	6.9 – 12.0	372,328	7.9	5.2 – 10.6	512,502	8.5	6.0 – 10.9
Other sales	1,264,773	9.1	7.1 – 11.0	457,155	8.8	6.1 – 11.5	616,122	10.6	7.7 – 13.5
Food service	1,075,914	9.0	6.9 – 11.1	259,196	10.7	6.3 – 15.2	855,512	10.5	8.1 – 12.8
Freight, stock and material handlers	1,547,804	8.9	7.2 – 10.6	423,927	10.5	7.2 – 13.8	940,416	9.0	6.9 – 11.2
Teachers, librarians, and counselors	1,478,263	8.9	7.4 – 10.4	453,190	11.1	8.1 – 14.1	239,180	6.5	3.6 – 9.3
Managers and administrators, except public administration	3,872,381	8.8	7.9 – 9.8	1,916,923	8.3	6.9 – 9.8	1,568,857	6.9	5.6 – 8.2
Technologist and technicians except health	1,045,383	8.7	6.8 – 10.6	408,722	9.8	6.6 – 13.0	345,442	9.9	6.5 – 13.2
Other protective service	334,597	8.7	5.4 – 11.9	167,790	7.4	3.6 – 11.2	195,338	8.1	4.5 – 11.7
Natural mathematical and computer scientists	1,169,859	8.6	6.9 – 10.3	412,986	8.1	5.0 – 11.1	255,212	9.0	5.5 – 12.6
Supervisors and proprietors	1,185,799	8.2	6.5 – 9.9	562,384	6.1	4.0 – 8.1	559,240	6.0	4.1 – 8.0
Police and firefighters	750,317	7.9	5.7 – 10.0	264,568	9.3	5.3 – 13.3	208,727	5.8	2.8 – 8.8
Writers, artists, entertainers, and athletes	682,903	7.9	5.9 – 10.0	269,542	10.7	7.0 – 14.5	237,280	7.4	4.1 – 10.7
Management related	1,276,453	7.8	6.2 – 9.4	519,443	8.3	5.9 – 10.7	359,307	8.4	5.6 – 11.3
Sales representatives, commodities and finance	1,440,892	7.7	6.1 – 9.3	715,112	8.0	5.9 – 10.1	492,132	8.9	6.1 – 11.6
Officials and administrators, public administration	211,360	7.7	4.0 – 11.3	138,113	8.3	2.7 – 14.0	55,574	7.4	0.3 – 14.6
Motor vehicle operators	1,455,031	7.6	6.0 – 9.1	835,501	6.8	5.0 – 8.5	1,206,000	6.7	5.1 – 8.3
Engineers	1,167,515	7.3	5.6 – 8.9	389,506	7.0	4.3 – 9.7	224,853	9.6	5.7 – 13.5
Health diagnosing	559,165	7.1	4.8 – 9.5	169,141	7.9	3.2 – 12.7	32,205	-	-
Mechanics and repairers	1,888,029	6.8	5.6 – 8.0	1,144,308	7.8	6.0 – 9.6	1,430,335	7.3	5.8 – 8.8
Machine operators and tenderers, except precision	1,261,403	6.7	5.3 – 8.2	586,889	6.9	4.2 – 9.6	1,054,754	6.8	5.2 – 8.4

See footnotes at end of table.

Table 9-18 (page 2 of 2). Asthma: Estimated prevalence by current occupation and smoking status, U.S. male residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Farm operators and managers	443,572	6.7	3.9 – 9.6	183,077	5.5	2.5 – 8.6	108,186	1.3	0.0 – 3.3
Precision production	1,086,607	6.5	4.9 – 8.0	668,954	8.4	6.0 – 10.8	823,845	7.4	5.5 – 9.2
Secretaries, stenographers, and typists	36,365	6.5	0.0 – 14.9	12,181	13.7	0.0 – 32.6	11,328	11.1	0.0 – 31.5
Health service	142,779	6.3	2.5 – 10.2	46,093	6.6	0.0 – 13.3	96,996	12.3	6.1 – 18.6
Health technologist and technicians	229,360	6.1	2.7 – 9.5	64,601	8.8	1.4 – 16.3	79,124	9.5	3.1 – 15.8
Construction and extractive trades	2,389,704	5.9	4.8 – 6.9	1,079,560	7.6	6.0 – 9.3	2,180,360	6.2	5.1 – 7.2
Fabricators, assemblers, inspectors and samplers	724,511	5.8	3.9 – 7.7	347,934	10.2	6.8 – 13.7	575,251	8.0	5.5 – 10.6
Mail and message distributing	265,063	5.8	2.3 – 9.3	136,442	7.2	2.7 – 11.6	113,527	12.6	5.8 – 19.5
Material moving equipment operators	468,082	5.7	3.6 – 7.8	244,344	7.2	3.4 – 11.0	382,728	8.5	5.3 – 11.8
Construction laborers	480,846	5.5	3.3 – 7.7	167,989	5.2	1.8 – 8.7	378,735	6.3	3.9 – 8.6
Farm workers and other agricultural workers	837,877	5.4	3.3 – 7.4	281,622	9.3	5.3 – 13.3	489,857	7.0	4.6 – 9.5
Health assessment and treating occupations	266,133	5.4	2.6 – 8.2	105,458	12.8	5.3 – 20.4	61,057	4.9	0.0 – 10.0
Other transportation, except motor vehicles	84,043	3.9	0.0 – 9.1	51,671	2.9	0.0 – 6.3	52,907	13.9	1.7 – 26.1
Military	7,735	-	-	5,609	-	-	3,218	13.7	0.0 – 40.7
Refused, not ascertained, don't know	1,389,892	4.4	3.3 – 5.5	362,111	7.5	4.5 – 10.5	448,392	5.9	3.8 – 8.0
TOTAL	**36,539,662**	**7.8**	**7.5 – 8.1**	**15,513,906**	**8.3**	**7.8 – 8.8**	**18,370,185**	**7.7**	**7.3 – 8.1**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-19 (page 1 of 2). Asthma: Estimated prevalence by current occupation and smoking status, U.S. female residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Officials and administrators, public administration	220,201	5.6	2.8 – 8.4	89,460	8.8	3.5 – 14.0	61,349	6.6	0.7 – 12.5
Police and firefighters	132,786	5.6	1.5 – 9.6	31,735	0.0	-	55,878	5.5	0.0 – 11.5
Other professional specialty	909,707	5.6	4.1 – 7.1	330,821	4.2	2.1 – 6.2	205,699	4.2	1.9 – 6.5
Engineers	151,038	5.3	1.9 – 8.7	27,760	11.1	0.0 – 23.6	24,035	2.1	0.0 – 6.3
Teachers, librarians, and counselors	3,468,490	5.2	4.4 – 6.0	811,447	6.2	4.6 – 7.8	475,430	4.2	2.4 – 6.1
Farm workers and other agricultural workers	222,703	5.0	1.8 – 8.2	49,655	-	0.0 – 0.0	94,436	2.8	0.5 – 5.1
Health technologist and technicians	889,100	4.9	3.4 – 6.4	267,158	6.7	3.7 – 9.8	332,399	6.1	3.7 – 8.4
Technologist and technicians except health	519,699	4.8	3.1 – 6.6	141,367	4.3	1.3 – 7.4	185,022	5.1	2.4 – 7.9
Health assessment and treating occupations	1,891,276	4.5	3.6 – 5.4	609,435	5.4	3.6 – 7.3	399,501	4.4	2.4 – 6.3
Managers and administrators, except public administration	2,865,633	4.5	3.7 – 5.2	1,075,062	5.6	4.2 – 6.9	1,166,159	4.0	2.9 – 5.1
Other administrative support	5,106,381	4.5	4.0 – 5.1	1,390,390	5.7	4.5 – 6.9	1,827,172	3.8	3.0 – 4.6
Financial records processing	1,098,535	4.4	2.6 – 6.1	371,249	4.1	2.2 – 6.0	423,950	5.1	3.1 – 7.0
Supervisors and proprietors	812,965	4.4	2.9 – 5.8	300,593	5.0	2.4 – 7.6	424,163	4.1	2.3 – 6.0
Personal service	1,405,968	4.3	3.1 – 5.4	397,473	8.6	5.7 – 11.6	460,906	4.1	2.3 – 5.8
Computer equipment operators	127,759	4.3	0.5 – 8.1	34,268	4.5	0.0 – 9.5	43,075	3.5	0.0 – 8.3
Health diagnosing	232,484	4.3	1.3 – 7.3	42,299	7.4	0.2 – 14.5	22,309	-	-
Writers, artists, entertainers, and athletes	692,906	4.2	2.8 – 5.7	261,168	5.5	2.9 – 8.1	172,638	2.9	0.8 – 5.0
Other protective service	148,231	4.1	1.3 – 7.0	35,050	8.8	0.0 – 18.2	81,632	9.6	3.9 – 15.3
Health service	1,336,120	4.1	2.9 – 5.2	342,732	7.1	4.4 – 9.8	674,356	7.1	5.2 – 9.0
Other sales	2,235,985	4.0	3.0 – 4.9	539,443	4.6	2.9 – 6.4	1,033,304	6.0	4.5 – 7.4
Management related	1,804,092	4.0	3.1 – 5.0	570,587	5.6	3.8 – 7.5	583,354	3.2	2.0 – 4.5
Architects and surveyors	33,126	4.0	0.0 – 9.6	3,977	-	0.0 – 0.0	3,543	-	-
Secretaries, stenographers, and typists	1,609,775	3.9	3.0 – 4.9	498,587	5.6	3.5 – 7.6	508,695	4.1	2.2 – 6.0
Mechanics and repairers	98,179	3.7	0.0 – 7.4	42,676	8.1	0.1 – 16.0	65,010	7.4	1.4 – 13.4
Food service	1,561,496	3.5	2.6 – 4.5	402,155	4.4	2.5 – 6.4	1,210,298	5.8	4.5 – 7.2
Motor vehicle operators	259,178	3.5	1.5 – 5.4	84,885	9.3	3.5 – 15.1	160,657	5.5	2.2 – 8.8
Sales representatives, commodities and finance	890,693	3.5	2.2 – 4.7	321,575	3.2	1.4 – 5.0	359,762	4.4	2.4 – 6.4

See footnotes at end of table.

Table 9-19 (page 2 of 2). Asthma: Estimated prevalence by current occupation and smoking status, U.S. female residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Natural mathematical and computer scientists	554,934	3.5	2.1 – 4.8	145,870	6.2	2.6 – 9.8	99,027	4.4	0.4 – 8.3
Cleaning and building service	856,612	3.3	2.1 – 4.4	163,847	5.4	1.8 – 9.0	400,609	4.8	3.0 – 6.6
Construction and extractive trades	56,976	2.9	0.0 – 7.1	23,240	8.2	0.0 – 23.1	72,338	3.9	0.0 – 8.0
Mail and message distributing	195,479	2.6	0.6 – 4.6	83,788	5.5	1.3 – 9.6	94,557	4.1	0.1 – 8.1
Fabricators, assemblers, inspectors and samplers	588,217	2.5	1.2 – 3.9	137,116	6.1	2.4 – 9.7	271,781	2.7	1.1 – 4.4
Precision production	429,435	2.3	1.0 – 3.6	140,321	5.1	1.2 – 8.9	239,975	4.8	2.1 – 7.6
Machine operators and tenderers, except precision	852,992	2.2	1.2 – 3.3	196,545	3.3	0.9 – 5.6	431,808	3.1	1.3 – 4.9
Freight, stock and material handlers	525,591	2.1	0.9 – 3.3	90,544	2.5	0.0 – 5.0	296,607	2.9	1.2 – 4.6
Private household	431,023	1.8	0.6 – 2.9	104,321	6.9	1.6 – 12.2	117,937	5.7	0.0 – 11.5
Farm operators and managers	100,037	1.0	0.0 – 3.0	26,660	5.9	0.0 – 13.8	28,396	4.6	0.0 – 11.1
Material moving equipment operators	29,822	1.0	0.0 – 2.9	13,351	4.4	0.0 – 12.9	32,397	3.8	0.0 – 9.5
Construction laborers	10,386	-	-	2,396	-	-	13,780	12.4	0.0 – 30.5
Other transportation, except motor vehicles	1,572	-	-	648	-	-	2,080	11.2	0.0 – 33.9
Forestry and fishing	2,648	-	-	1,869	-	-	821	-	-
Military	2,844	-	-	1,586	-	-	1,971	-	-
Refused, not ascertained, don't know	1,428,577	2.0	1.4 – 2.7	238,781	5.3	2.8 – 7.7	333,188	3.7	1.8 – 5.5
TOTAL	**36,792,977**	**9.7**	**9.4 – 10.0**	**10,446,053**	**12.5**	**11.8 – 13.1**	**13,496,359**	**11.5**	**10.9 – 12.0**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-20 (page 1 of 2). Asthma attack in past 12 months: Estimated prevalence by current industry and smoking status, U.S. residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Social services, religious and membership organizations	2,926,783	5.2	4.3 – 6.1	996,694	5.0	3.7 – 6.2	855,931	4.2	2.9 – 5.4
Health services, except hospitals	4,220,379	4.3	3.6 – 4.9	1,326,263	5.3	4.0 – 6.5	1,544,324	5.1	4.1 – 6.1
Elementary and secondary schools and colleges	7,395,372	4.3	3.9 – 4.8	2,004,792	4.7	3.8 – 5.6	1,330,442	2.9	2.0 – 3.7
Printing publishing and allied industries	818,225	4.2	2.7 – 5.7	371,680	2.9	1.3 – 4.5	433,901	1.9	0.6 – 3.2
Banking and credit agencies	1,774,282	4.0	3.0 – 4.9	504,815	3.0	1.5 – 4.4	546,012	3.4	1.9 – 5.0
Furniture, lumber and wood	687,181	3.9	2.0 – 5.8	273,128	2.3	0.7 – 3.9	477,650	1.0	0.1 – 1.9
Eating and drinking places	2,884,106	3.8	3.0 – 4.6	695,747	3.3	1.8 – 4.9	2,248,445	4.4	3.5 – 5.3
Communications	1,104,050	3.7	2.5 – 4.8	390,508	3.8	2.0 – 5.6	422,291	4.0	2.2 – 5.8
Entertainment and recreation services	1,374,662	3.6	2.3 – 5.0	437,711	6.1	3.7 – 8.4	517,506	2.7	1.3 – 4.1
Hospitals	3,323,384	3.5	2.9 – 4.1	1,009,095	5.0	3.7 – 6.4	905,288	3.9	2.7 – 5.2
Business services	3,964,486	3.4	2.8 – 4.0	1,361,870	4.2	3.1 – 5.3	1,767,725	4.1	3.2 – 5.1
Legal, engineering and other professional services	3,005,822	3.4	2.7 – 4.0	1,097,289	4.1	2.9 – 5.2	792,489	2.6	1.6 – 3.7
Insurance, real estate and other finance	3,170,966	3.3	2.5 – 4.0	1,247,369	3.6	2.6 – 4.6	1,155,766	3.6	2.5 – 4.6
Other and not specified retail trade	3,588,458	3.3	2.6 – 3.9	1,240,551	2.9	2.0 – 3.8	1,529,268	3.3	2.5 – 4.2
Automotive dealers and gasoline stations	921,072	3.3	2.0 – 4.6	397,469	2.3	0.9 – 3.8	672,853	2.9	1.4 – 4.3
Food, bakery and dairy stores	1,526,023	3.2	2.1 – 4.3	446,161	2.9	1.5 – 4.3	861,100	5.0	3.5 – 6.6
Public administration	3,573,316	3.1	2.5 – 3.7	1,406,952	3.2	2.3 – 4.1	1,187,671	2.9	2.0 – 3.8
Other educational services	349,521	3.0	1.5 – 4.5	137,436	3.0	0.6 – 5.5	76,686	3.4	0.2 – 6.6
General merchandise stores	1,338,543	2.9	1.9 – 3.8	377,356	4.7	2.7 – 6.7	564,335	3.8	2.1 – 5.5
Transportation equipment	1,107,039	2.8	1.7 – 3.8	556,899	3.1	1.5 – 4.7	597,209	2.9	1.5 – 4.3
Other transportation	1,520,149	2.7	1.8 – 3.6	709,055	2.9	1.8 – 4.1	677,128	4.1	2.6 – 5.6
Other personal services	1,674,915	2.6	1.8 – 3.4	607,166	4.4	2.6 – 6.1	913,108	3.6	2.4 – 4.8
Other and not specified durable goods	1,104,659	2.5	1.4 – 3.5	449,663	4.6	2.5 – 6.7	534,616	2.3	1.1 – 3.5
Wholesale trade	2,137,212	2.5	1.8 – 3.2	952,149	2.9	1.8 – 4.0	1,089,183	1.7	1.0 – 2.4
Chemicals and allied products	680,301	2.4	1.2 – 3.5	266,746	0.7	0.0 – 1.7	252,556	1.1	0.0 – 2.3
Trucking service and warehousing	1,197,822	2.2	1.3 – 3.2	494,129	2.0	0.6 – 3.4	789,818	2.6	1.4 – 3.7
Utilities and sanitary	732,957	2.2	1.1 – 3.3	338,062	3.2	1.2 – 5.3	333,258	1.0	0.1 – 1.8
Primary metal industry	326,480	2.1	0.5 – 3.7	169,513	2.2	0.1 – 4.3	247,279	3.6	0.9 – 6.4

See footnotes at end of table.

Table 9-20 (page 2 of 2). Asthma attack in past 12 months: Estimated prevalence by current industry and smoking status, U.S. residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Construction	3,985,288	2.1	1.6 – 2.5	1,804,630	1.9	1.3 – 2.6	3,296,357	1.8	1.4 – 2.3
Private households	543,221	2.0	1.0 – 3.1	136,039	7.5	3.1 – 11.9	177,152	4.6	0.5 – 8.6
Electrical machinery, equipment and supplies	915,210	2.0	1.2 – 2.8	312,445	2.7	0.7 – 4.7	388,785	1.8	0.2 – 3.4
Fabricated metal industries, including ordnance	459,245	1.9	0.6 – 3.2	256,876	4.3	1.2 – 7.4	369,407	2.6	0.7 – 4.6
Agriculture	1,692,103	1.9	1.2 – 2.7	570,676	2.5	1.3 – 3.7	710,409	2.1	1.1 – 3.1
Mining	238,721	1.9	0.4 – 3.4	89,919	0.9	0.0 – 2.3	162,418	1.6	0.1 – 3.0
Railroads	123,505	1.9	0.0 – 5.5	76,471	1.1	0.0 – 2.6	79,725	0.7	0.0 – 1.6
Repair services	774,323	1.8	0.8 – 2.8	442,147	1.7	0.6 – 2.9	697,805	3.5	2.0 – 5.1
Machinery, except electrical	1,012,010	1.8	1.0 – 2.7	465,639	3.0	1.2 – 4.9	548,260	1.9	0.6 – 3.1
Textile mill and finished textile products	668,322	1.4	0.5 – 2.2	188,813	2.2	0.1 – 4.2	325,896	1.5	0.3 – 2.6
Other nondurable goods	705,306	1.3	0.5 – 2.0	367,915	2.1	0.7 – 3.5	450,861	2.1	0.6 – 3.7
Food and kindred products	963,813	1.3	0.6 – 2.0	368,240	0.8	0.0 – 1.5	541,573	1.1	0.3 – 1.8
Forestry and fisheries	81,726	0.4	0.0 – 1.3	42,998	-	-	36,539	-	-
Armed forces (excludes Reserves and National Guard)	19,585	-	-	8,740	-	-	5,636	7.8	0.0 – 23.3
Refused, not ascertained, don't know	2,713,880	1.5	1.0 – 2.0	556,268	2.9	1.6 – 4.2	744,936	2.8	1.7 – 3.8
TOTAL	**73,324,420**	**3.2**	**3.0 – 3.3**	**25,954,077**	**3.5**	**3.3 – 3.7**	**31,859,595**	**3.1**	**2.9 – 3.3**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-21 (page 1 of 2). Asthma attack in past 12 months: Estimated prevalence by current industry and smoking status, U.S. male residents age 18 and over, 1997–2004

Industry	Nonsmokers			Current Smokers			Former Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Printing publishing and allied industries	436,865	3.6	1.5 – 5.7	280,669	1.7	0.1 – 3.2	227,159	2.6	0.6 – 4.6
Eating and drinking places	1,351,454	3.3	2.1 – 4.5	1,010,197	2.6	1.5 – 3.7	333,229	3.3	0.5 – 6.0
Communications	629,337	3.1	1.7 – 4.6	252,357	3.3	1.0 – 5.7	250,291	1.5	0.2 – 2.9
Business services	2,223,188	3.1	2.2 – 3.9	1,002,209	3.0	1.9 – 4.1	832,901	2.9	1.8 – 4.1
Social services, religious and membership organizations	719,760	3.1	1.8 – 4.4	213,433	2.5	0.4 – 4.6	340,194	2.5	1.1 – 4.0
Legal, engineering and other professional services	1,591,163	3.0	2.1 – 3.8	387,374	1.9	0.4 – 3.3	641,272	3.0	1.7 – 4.3
Elementary and secondary schools and colleges	2,224,341	3.0	2.3 – 3.8	457,917	1.1	0.2 – 1.9	711,146	2.0	1.0 – 3.0
Food, bakery and dairy stores	724,506	2.8	1.4 – 4.2	360,656	2.5	0.8 – 4.1	237,988	1.4	0.1 – 2.7
Insurance, real estate and other finance	1,449,079	2.8	1.9 – 3.8	501,032	1.9	0.7 – 3.0	673,128	2.0	0.9 – 3.1
Banking and credit agencies	532,216	2.8	0.9 – 4.7	182,624	1.4	0.0 – 2.9	193,417	1.7	0.0 – 3.3
Other educational services	91,214	2.8	0.0 – 6.2	31,996	-	-	58,862	1.2	0.0 – 3.5
Other transportation	897,513	2.6	1.3 – 3.8	447,574	2.9	1.2 – 4.6	502,733	1.1	0.2 – 2.0
Furniture, lumber and wood	488,909	2.6	1.0 – 4.3	373,564	0.7	0.0 – 1.7	225,719	2.4	0.6 – 4.2
Other personal services	520,249	2.4	1.0 – 3.8	367,235	2.4	0.7 – 4.1	268,906	2.6	0.5 – 4.8
Transportation equipment	820,586	2.4	1.2 – 3.5	439,923	2.2	0.7 – 3.7	449,922	2.8	1.1 – 4.5
Automotive dealers and gasoline stations	683,611	2.4	1.0 – 3.8	466,183	1.9	0.1 – 3.6	322,278	1.9	0.4 – 3.3
Entertainment and recreation services	796,115	2.4	0.9 – 3.8	305,929	1.5	0.1 – 2.9	251,642	3.2	1.1 – 5.4
Health services, except hospitals	896,975	2.2	1.2 – 3.2	230,733	4.5	2.1 – 6.8	320,868	3.0	0.4 – 5.6
Machinery, except electrical	749,288	2.2	1.1 – 3.3	437,389	2.1	0.6 – 3.7	380,228	2.7	0.6 – 4.9
Wholesale trade	1,436,034	2.2	1.3 – 3.0	804,606	1.1	0.5 – 1.8	735,735	1.9	0.8 – 2.9
Chemicals and allied products	437,442	2.2	0.9 – 3.6	165,918	0.9	0.0 – 2.1	195,022	0.9	0.0 – 2.3
Trucking service and warehousing	954,496	2.1	1.0 – 3.2	646,785	2.3	1.1 – 3.6	427,023	1.4	0.0 – 2.8
Other and not specified retail trade	1,626,531	2.1	1.3 – 2.9	775,766	1.8	0.9 – 2.7	646,741	2.1	1.0 – 3.1
Utilities and sanitary	581,915	2.1	0.9 – 3.4	271,018	0.8	0.0 – 1.7	281,922	3.2	0.9 – 5.5
Hospitals	751,433	1.9	0.9 – 2.9	204,907	2.7	0.5 – 4.8	278,750	2.3	0.4 – 4.2
Construction	3,553,325	1.9	1.4 – 2.4	3,041,470	1.7	1.2 – 2.2	1,649,806	1.4	0.8 – 1.9
Other and not specified durable goods	694,378	1.9	0.7 – 3.2	373,867	1.3	0.1 – 2.5	323,603	4.1	1.5 – 6.7
Primary metal industry	280,072	1.8	0.2 – 3.4	212,678	3.8	0.7 – 7.0	145,923	2.5	0.1 – 5.0

See footnotes at end of table.

Table 9-21 (page 2 of 2). Asthma attack in past 12 months: Estimated prevalence by current industry and smoking status, U.S. male residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Public administration	1,913,141	1.7	1.2 – 2.3	876,657	2.1	1.1 – 3.0	593,863	1.7	0.7 – 2.7
Fabricated metal industries, including ordnance	350,276	1.6	0.1 – 3.0	207,868	3.9	0.3 – 7.5	295,535	1.8	0.2 – 3.5
Repair services	664,515	1.5	0.4 – 2.5	411,488	1.6	0.4 – 2.8	634,585	2.9	1.3 – 4.5
Electrical machinery, equipment and supplies	586,945	1.5	0.6 – 2.4	212,249	1.1	0.0 – 2.2	235,722	0.7	0.0 – 2.0
Agriculture	1,267,735	1.4	0.6 – 2.2	461,568	2.4	1.0 – 3.7	560,075	1.6	0.6 – 2.7
Mining	204,301	1.3	0.0 – 2.7	80,906	-	-	147,303	1.5	0.0 – 3.1
Food and kindred products	608,220	0.9	0.2 – 1.7	286,064	0.5	0.0 – 1.3	387,603	1.1	0.2 – 2.1
Other nondurable goods	494,180	0.7	0.0 – 1.5	300,751	1.9	0.4 – 3.5	320,082	2.2	0.3 – 4.1
Textile mill and finished textile products	265,252	0.7	0.0 – 1.7	120,345	0.7	0.0 – 1.9	161,601	-	-
General merchandise stores	441,285	0.4	0.0 – 1.0	170,824	1.4	0.0 – 2.8	203,243	4.0	0.9 – 7.0
Armed forces (excludes Reserves and National Guard)	14,026	-	-	7,154	-	-	3,218	13.7	0.0 – 40.7
Railroads	111,392	-	-	72,740	1.1	0.0 – 2.8	74,998	0.4	0.0 – 1.2
Forestry and fisheries	60,105	-	-	33,924	-	-	31,731	-	-
Private households	28,358	-	-	8,885	-	-	25,100	-	-
Refused, not ascertained, don't know	1,381,048	1.3	0.6 – 1.9	352,362	2.0	0.5 – 3.5	446,928	1.8	0.7 – 2.8
TOTAL	**36,532,771**	**2.2**	**2.1 – 2.4**	**15,510,190**	**2.1**	**1.9– 2.3**	**18,367,592**	**2.0**	**1.8 – 2.2**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-22 (page 1 of 2). Asthma attack in past 12 months: Estimated prevalence by current industry and smoking status, U.S. female residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Railroads	12,112	19.1	0.0 – 50.5	3,731	-	-	4,727	4.9	0.0 – 14.6
Furniture, lumber and wood	198,272	7.0	2.0 – 11.9	47,409	1.7	0.0 – 4.9	104,087	2.2	0.0 – 4.4
Social services, religious and membership organizations	2,207,023	5.9	4.8 – 7.0	656,500	6.2	4.4 – 8.0	642,498	4.7	3.2 – 6.2
Automotive dealers and gasoline stations	237,462	5.8	2.6 – 9.0	75,192	4.4	0.1 – 8.7	206,670	5.0	2.3 – 7.7
Mining	34,420	5.6	0.0 – 12.2	9,012	9.4	0.0 – 22.7	15,115	2.0	0.0 – 6.0
Entertainment and recreation services	578,547	5.3	2.8 – 7.8	186,070	9.9	5.3 – 14.6	211,577	4.4	1.8 – 7.1
Elementary and secondary schools and colleges	5,171,032	4.9	4.3 – 5.5	1,293,646	6.2	4.9 – 7.5	872,525	3.8	2.5 – 5.1
Printing publishing and allied industries	381,360	4.9	2.7 – 7.1	144,521	3.4	0.5 – 6.3	153,233	2.3	0.1 – 4.6
Health services, except hospitals	3,323,405	4.8	4.1 – 5.6	1,005,395	6.0	4.5 – 7.4	1,313,591	5.2	4.1 – 6.3
Public administration	1,660,175	4.7	3.7 – 5.7	530,295	5.0	3.4 – 6.7	593,808	4.1	2.6 – 5.6
Communications	474,713	4.4	2.5 – 6.3	140,216	7.8	3.4 – 12.2	169,933	5.0	2.1 – 7.9
Banking and credit agencies	1,242,065	4.4	3.3 – 5.6	311,398	3.8	1.7 – 5.9	363,388	4.4	2.3 – 6.6
Eating and drinking places	1,532,651	4.2	3.1 – 5.4	362,518	3.4	1.7 – 5.1	1,238,248	5.9	4.6 – 7.2
Other and not specified retail trade	1,961,927	4.2	3.3 – 5.2	593,809	3.7	2.2 – 5.2	753,502	5.0	3.5 – 6.4
General merchandise stores	897,258	4.1	2.7 – 5.5	206,532	7.5	4.1 – 10.9	361,092	3.7	1.7 – 5.8
Primary metal industry	46,408	4.0	0.0 – 9.4	23,590	-	-	34,601	2.5	0.0 – 6.1
Business services	1,741,298	3.9	3.0 – 4.8	528,969	6.2	4.1 – 8.2	765,516	5.6	4.0 – 7.1
Hospitals	2,571,951	3.9	3.2 – 4.7	730,345	6.1	4.3 – 7.8	700,381	4.3	2.8 – 5.8
Repair services	109,808	3.8	0.7 – 6.9	30,659	3.1	0.0 – 9.2	63,220	9.8	3.1 – 16.6
Transportation equipment	286,453	3.8	1.4 – 6.3	106,977	4.3	0.5 – 8.1	157,287	4.9	1.9 – 7.8
Legal, engineering and other professional services	1,414,660	3.8	2.8 – 4.9	456,017	5.6	3.6 – 7.5	405,115	3.4	1.8 – 5.0
Agriculture	424,368	3.7	1.7 – 5.6	109,108	2.9	0.0 – 6.0	150,333	3.9	1.3 – 6.6
Food, bakery and dairy stores	801,517	3.6	2.0 – 5.1	208,173	4.7	2.1 – 7.3	500,444	6.9	4.5 – 9.3
Insurance, real estate and other finance	1,721,887	3.6	2.4 – 4.8	574,241	5.5	3.7 – 7.3	654,735	4.9	3.3 – 6.4
Construction	431,963	3.6	1.6 – 5.5	154,824	7.9	3.1 – 12.6	254,887	3.5	1.5 – 5.6
Other and not specified durable goods	410,281	3.4	1.6 – 5.3	126,059	5.8	2.3 – 9.4	160,749	4.5	1.6 – 7.4
Wholesale trade	701,178	3.2	2.0 – 4.5	216,414	6.5	3.2 – 9.8	284,577	3.2	1.4 – 4.9
Other educational services	258,307	3.1	1.5 – 4.7	78,574	4.4	0.5 – 8.3	44,690	5.8	0.4 – 11.3

See footnotes at end of table.

Table 9-22 (page 2 of 2). Asthma attack in past 12 months: Estimated prevalence by current industry and smoking status, U.S. female residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Fabricated metal industries, including ordnance	108,970	3.1	0.2 – 6.0	49,008	6.0	0.0 – 12.3	73,872	5.8	0.0 – 12.8
Other transportation	622,636	2.9	1.7 – 4.0	206,322	7.4	4.1 – 10.7	229,554	6.4	3.6 – 9.2
Electrical machinery, equipment and supplies	328,265	2.9	1.1 – 4.6	100,196	6.2	0.6 – 11.8	153,063	3.5	0.1 – 6.9
Other personal services	1,154,666	2.7	1.7 – 3.6	338,260	5.8	3.1 – 8.4	545,874	4.4	2.9 – 6.0
Trucking service and warehousing	243,326	2.7	0.6 – 4.8	67,106	6.1	0.9 – 11.2	143,033	3.5	0.8 – 6.2
Utilities and sanitary	151,042	2.6	0.4 – 4.8	56,140	3.4	0.0 – 7.1	62,240	1.8	0.0 – 4.1
Chemicals and allied products	242,859	2.6	0.5 – 4.8	71,724	-	-	86,638	1.7	0.0 – 4.2
Other nondurable goods	211,125	2.5	0.7 – 4.3	67,164	2.9	0.0 – 6.5	130,779	2.0	0.0 – 4.3
Private households	514,863	2.1	1.0 – 3.2	127,154	8.0	3.3 – 12.8	152,052	5.3	0.7 – 10.0
Food and kindred products	355,593	1.9	0.4 – 3.4	82,176	1.6	0.0 – 3.5	153,969	0.9	0.0 – 1.8
Textile mill and finished textile products	403,070	1.8	0.5 – 3.1	68,468	4.8	0.0 – 9.8	164,295	2.9	0.5 – 5.2
Forestry and fisheries	21,621	1.7	0.0 – 5.0	9,074	-	-	4,808	-	-
Machinery, except electrical	262,722	0.9	0.0 – 1.9	85,411	4.4	0.7 – 8.0	110,871	0.9	0.0 – 2.3
Armed forces (excludes Reserves and National Guard)	5,559	-	-	1,586	-	-	2,418	-	-
Refused, not ascertained, don't know	1,332,832	1.7	1.1 – 2.4	203,906	4.4	2.0 – 6.8	298,008	4.3	2.1 – 6.4
TOTAL	**36,791,650**	**4.1**	**3.9 – 4.3**	**10,443,887**	**5.5**	**5.1 – 6.0**	**13,492,003**	**4.6**	**4.2 – 4.9**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-23 (page 1 of 2). Asthma attack in past 12 months: Estimated prevalence by current occupation and smoking status, U.S. residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Architects and surveyors	139,408	4.7	1.4 – 8.1	59,655	1.5	0.0 – 4.3	30,361	-	-
Teachers, librarians, and counselors	4,946,322	4.5	3.9 – 5.1	1,264,637	4.9	3.8 – 6.1	714,610	3.2	1.9 – 4.5
Health technologist and technicians	1,118,460	4.2	2.9 – 5.4	331,759	5.5	3.1 – 8.0	411,523	6.0	3.9 – 8.2
Financial records processing	1,225,524	4.2	2.6 – 5.8	407,538	3.8	2.0 – 5.5	471,378	4.9	3.1 – 6.7
Health assessment and treating occupations	2,157,409	4.2	3.4 – 5.1	714,893	5.5	3.7 – 7.3	460,559	4.1	2.3 – 5.8
Other professional specialty	1,838,285	4.2	3.3 – 5.1	746,664	3.1	1.9 – 4.4	353,436	3.0	1.4 – 4.6
Other administrative support	6,749,571	4.1	3.6 – 4.6	1,992,076	4.7	3.8 – 5.6	2,565,801	3.5	2.8 – 4.2
Secretaries, stenographers, and typists	1,646,141	4.0	3.0 – 4.9	510,767	5.7	3.6 – 7.7	520,023	4.2	2.3 – 6.1
Health service	1,478,898	3.8	2.8 – 4.9	388,825	6.6	4.2 – 9.0	771,352	6.8	5.1 – 8.6
Personal service	1,668,368	3.8	2.8 – 4.8	504,559	7.1	4.7 – 9.5	574,309	4.2	2.6 – 5.7
Technologists and technicians except health	1,565,082	3.8	2.8 – 4.9	550,089	2.8	1.5 – 4.1	530,464	2.5	1.3 – 3.7
Officials and administrators, public administration	431,561	3.7	2.0 – 5.4	227,573	3.6	1.4 – 5.7	116,922	5.6	1.4 – 9.8
Other protective service	481,854	3.6	2.1 – 5.2	202,840	3.8	1.3 – 6.4	276,970	5.0	2.6 – 7.3
Cleaning and building service	1,626,735	3.6	2.6 – 4.7	536,175	3.0	1.5 – 4.4	913,111	3.0	2.1 – 4.0
Food service	2,636,258	3.5	2.7 – 4.3	661,352	4.1	2.3 – 5.8	2,065,809	4.4	3.5 – 5.3
Writers, artists, entertainers, and athletes	1,375,809	3.5	2.6 – 4.5	530,710	4.6	2.8 – 6.4	409,918	2.5	1.1 – 3.8
Other sales	3,500,215	3.4	2.7 – 4.1	996,598	3.7	2.5 – 4.8	1,649,426	4.7	3.6 – 5.7
Management related	3,080,545	3.4	2.7 – 4.1	1,089,447	4.2	3.1 – 5.4	942,661	2.5	1.6 – 3.4
Managers and administrators, except public administration	6,738,014	3.3	2.8 – 3.7	2,989,964	3.5	2.8 – 4.1	2,735,016	2.9	2.2 – 3.5
Health diagnosing	791,649	3.3	1.9 – 4.7	211,441	2.7	0.3 – 5.1	54,515	-	-
Supervisors and proprietors	1,998,764	3.1	2.3 – 4.0	862,976	2.4	1.3 – 3.5	983,403	2.4	1.5 – 3.3
Natural mathematical and computer scientists	1,724,794	3.0	2.2 – 3.8	558,856	3.3	1.8 – 4.8	354,239	3.4	1.4 – 5.5
Computer equipment operators	232,805	3.0	0.7 – 5.2	68,947	5.4	0.0 – 11.2	72,501	3.0	0.0 – 6.3
Sales representatives, commodities and finance	2,331,585	2.8	2.1 – 3.5	1,036,688	2.3	1.4 – 3.1	851,895	3.5	2.3 – 4.7
Motor vehicle operators	1,714,208	2.5	1.6 – 3.3	920,386	2.1	1.2 – 3.0	1,366,656	2.5	1.6 – 3.4
Freight, stock and material handlers	2,073,394	2.3	1.6 – 3.1	514,471	1.8	0.8 – 2.8	1,236,000	2.2	1.3 – 3.1
Farm workers and other agricultural workers	1,060,580	2.2	1.1 – 3.3	331,277	1.2	0.1 – 2.3	584,293	2.2	1.1 – 3.4
Machine operators and tenderers, except precision	2,114,395	2.1	1.4 – 2.7	783,434	2.6	1.5 – 3.7	1,486,562	1.8	1.1 – 2.5

See footnotes at end of table.

Table 9-23 (page 2 of 2). Asthma attack in past 12 months: Estimated prevalence by current occupation and smoking status, U.S. residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Precision production	1,515,201	2.0	1.3 – 2.8	809,275	2.8	1.6 – 4.1	1,063,820	2.2	1.3 – 3.1
Police and firefighters	883,103	2.0	1.1 – 3.0	296,303	2.4	0.5 – 4.3	264,605	2.2	0.4 – 3.9
Mechanics and repairers	1,984,557	2.0	1.3 – 2.7	1,186,984	1.9	1.2 – 2.7	1,495,345	1.9	1.1 – 2.7
Construction and extractive trades	2,446,680	1.8	1.2 – 2.3	1,102,800	1.4	0.7 – 2.2	2,252,697	1.5	1.0 – 2.1
Private household	447,662	1.7	0.6 – 2.8	110,594	6.5	1.5 – 11.5	130,476	5.1	0.0 – 10.4
Engineers	1,318,553	1.7	1.0 – 2.5	417,266	3.4	1.4 – 5.5	248,887	2.5	0.6 – 4.5
Forestry and fishing	62,234	1.7	0.0 – 4.1	32,761	1.4	0.0 – 4.2	60,530	1.1	0.0 – 3.2
Fabricators, assemblers, inspectors and samplers	1,312,728	1.6	0.9 – 2.4	485,050	3.4	1.8 – 5.0	847,032	2.8	1.6 – 3.9
Mail and message distributing	460,542	1.4	0.5 – 2.4	220,229	3.5	1.3 – 5.7	208,084	4.9	1.4 – 8.4
Construction laborers	491,231	1.3	0.3 – 2.4	170,385	1.8	0.0 – 3.9	392,515	2.8	1.2 – 4.3
Farm operators and managers	543,609	1.3	0.2 – 2.5	209,737	3.1	0.9 – 5.4	136,582	1.0	0.0 – 2.3
Material moving equipment operators	497,904	0.7	0.0 – 1.4	257,695	2.1	0.0 – 4.5	414,130	2.6	0.9 – 4.2
Military	10,579	-	-	7,194	-	-	5,189	8.5	0.0 – 25.4
Other transportation, except motor vehicles	85,616	-	-	52,319	1.0	0.0 – 3.0	54,987	0.4	0.0 – 1.3
Refused, not ascertained, don't know	2,817,589	1.6	1.1 – 2.0	600,891	3.5	2.1 – 4.8	781,006	2.4	1.4 – 3.3
TOTAL	**73,324,420**	**3.2**	**3.0 – 3.3**	**25,954,077**	**3.5**	**3.3 – 3.7**	**31,859,595**	**3.1**	**2.9 – 3.3**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-24 (page 1 of 2). Asthma attack in past 12 months: Estimated prevalence by current occupation and smoking status, U.S. male residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Secretaries, stenographers, and typists	36,365	5.8	0.0 – 14.0	12,181	9.2	0.0 – 26.4	11,328	11.1	0.0 – 31.5
Architects and surveyors	106,282	5.0	0.9 – 9.0	55,679	1.6	0.0 – 4.7	26,818	-	-
Cleaning and building service	770,123	4.1	2.2 – 5.9	372,328	1.9	0.6 – 3.2	512,502	1.7	0.7 – 2.6
Food service	1,074,763	3.5	2.2 – 4.8	259,196	3.5	0.2 – 6.9	855,512	2.4	1.3 – 3.4
Other protective service	333,623	3.4	1.5 – 5.3	167,790	2.8	0.5 – 5.1	195,338	3.0	0.6 – 5.4
Technologist and technicians except health	1,045,383	3.3	2.1 – 4.6	408,722	2.2	0.9 – 3.6	345,442	1.1	0.0 – 2.1
Health diagnosing	559,165	2.9	1.4 – 4.4	169,141	1.5	0.0 – 4.0	32,205	-	-
Financial records processing	126,989	2.8	0.0 – 5.6	36,289	-	-	47,428	3.7	0.0 – 9.0
Natural mathematical and computer scientists	1,169,859	2.8	1.8 – 3.7	412,986	2.3	0.7 – 3.9	255,212	3.1	0.7 – 5.5
Other administrative support	1,643,189	2.8	1.8 – 3.7	601,686	2.3	1.1 – 3.6	738,629	2.8	1.6 – 4.0
Writers, artists, entertainers, and athletes	682,903	2.8	1.5 – 4.1	269,542	3.8	1.3 – 6.3	237,280	2.2	0.4 – 3.9
Other professional specialty	928,578	2.8	1.8 – 3.9	415,843	2.3	0.8 – 3.8	147,738	1.3	0.0 – 3.4
Teachers, librarians, and counselors	1,477,832	2.8	2.0 – 3.7	453,190	2.7	1.3 – 4.1	239,180	1.1	0.0 – 2.2
Management related	1,276,453	2.5	1.6 – 3.4	518,859	2.7	1.3 – 4.0	359,307	1.3	0.3 – 2.4
Other sales	1,264,229	2.4	1.5 – 3.4	457,155	2.5	1.1 – 3.9	616,122	2.5	1.2 – 3.8
Managers and administrators, except public administration	3,872,381	2.4	1.9 – 2.9	1,914,902	2.3	1.6 – 3.0	1,568,857	2.0	1.3 – 2.8
Freight, stock and material handlers	1,547,804	2.4	1.5 – 3.3	423,927	1.7	0.6 – 2.7	939,394	2.0	0.9 – 3.1
Sales representatives, commodities and finance	1,440,892	2.3	1.5 – 3.1	715,112	1.8	0.8 – 2.8	492,132	2.8	1.3 – 4.2
Health assessment and treating occupations	266,133	2.3	0.1 – 4.4	105,458	5.8	0.0 – 11.6	61,057	2.1	0.0 – 5.4
Motor vehicle operators	1,455,031	2.3	1.4 – 3.2	835,501	1.4	0.6 – 2.2	1,206,000	2.1	1.2 – 3.0
Supervisors and proprietors	1,185,799	2.3	1.3 – 3.3	562,384	1.0	0.2 – 1.8	559,240	1.2	0.4 – 1.9
Mechanics and repairers	1,886,379	1.9	1.3 – 2.6	1,144,308	1.7	1.0 – 2.4	1,430,335	1.6	0.8 – 2.4
Precision production	1,085,766	1.9	1.0 – 2.8	668,954	2.4	1.1 – 3.6	823,845	1.5	0.6 – 2.3
Machine operators and tenderers, except precision	1,261,403	1.9	1.1 – 2.8	586,889	2.4	1.2 – 3.7	1,054,754	1.3	0.6 – 2.0
Health service	142,779	1.8	0.0 – 4.0	46,093	3.0	0.0 – 7.3	96,996	5.2	1.2 – 9.1
Officials and administrators, public administration	211,360	1.8	0.1 – 3.5	138,113	0.2	0.0 – 0.6	55,574	4.5	0.0 – 10.5
Construction and extractive trades	2,389,704	1.8	1.2 – 2.3	1,079,560	1.3	0.6 – 2.0	2,180,360	1.5	1.0 – 2.0
Forestry and fishing	59,586	1.8	0.0 – 4.3	30,892	1.5	0.0 – 4.5	59,709	1.1	0.0 – 3.2

See footnotes at end of table.

Table 9-24 (page 2 of 2). Asthma attack in past 12 months: Estimated prevalence by current occupation and smoking status, U.S. male residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Health technologist and technicians	229,360	1.5	0.0 – 3.2	64,601	0.6	0.0 – 1.7	79,124	5.9	0.9 – 10.8
Personal service	262,401	1.4	0.4 – 2.4	107,086	1.4	0.0 – 4.0	113,402	4.5	0.8 – 8.2
Farm workers and other agricultural workers	837,877	1.4	0.4 – 2.5	281,622	1.4	0.1 – 2.7	489,857	2.1	0.8 – 3.5
Police and firefighters	750,317	1.4	0.5 – 2.3	264,568	2.7	0.5 – 4.8	208,727	1.3	0.0 – 2.7
Farm operators and managers	443,572	1.4	0.1 – 2.8	183,077	2.7	0.4 – 5.1	108,186	-	-
Engineers	1,167,515	1.3	0.5 – 2.0	389,506	2.9	0.9 – 4.9	224,853	2.6	0.4 – 4.7
Construction laborers	480,846	1.3	0.3 – 2.4	167,989	1.9	0.0 – 3.9	378,735	2.4	0.9 – 3.9
Computer equipment operators	105,046	1.3	0.0 – 3.3	34,679	6.3	0.0 – 16.7	29,427	2.2	0.0 – 6.5
Fabricators, assemblers, inspectors and samplers	724,511	0.9	0.2 – 1.7	347,934	2.3	0.7 – 4.0	575,251	2.8	1.3 – 4.3
Material moving equipment operators	468,082	0.7	0.0 – 1.4	244,344	2.0	0.0 – 4.4	381,733	2.5	0.8 – 4.2
Mail and message distributing	265,063	0.6	0.0 – 1.4	136,442	2.3	0.0 – 4.8	113,527	5.5	0.1 – 10.9
Other transportation, except motor vehicles	84,043	-	-	51,671	1.0	0.0 – 3.0	52,907	-	-
Military	7,735	-	-	5,609	-	-	3,218	13.7	0.0 – 40.7
Private household	16,639	-	-	6,273	-	-	12,539	-	-
Refused, not ascertained, don't know	1,389,012	1.1	0.5 – 1.8	362,111	2.3	0.7 – 3.8	447,817	1.4	0.5 – 2.4
TOTAL	**36,532,771**	**2.2**	**2.1 – 2.4**	**15,510,190**	**2.1**	**1.9 – 2.3**	**18,367,592**	**2.0**	**1.8 – 2.2**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 9-25 (page 1 of 2). Asthma attack in past 12 months: Estimated prevalence by current occupation and smoking status, U.S. female residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Officials and administrators, public administration	220,201	5.6	2.8 – 8.4	89,460	8.8	3.5 – 14.0	61,349	6.6	0.7 – 12.5
Police and firefighters	132,786	5.6	1.5 – 9.6	31,735	-	-	55,878	5.5	0.0 – 11.5
Other professional specialty	909,707	5.6	4.1 – 7.1	330,821	4.2	2.1 – 6.2	205,699	4.2	1.9 – 6.5
Engineers	151,038	5.3	1.9 – 8.7	27,760	11.1	0.0 – 23.6	24,035	2.1	0.0 – 6.3
Teachers, librarians, and counselors	3,468,490	5.2	4.4 – 6.0	811,447	6.2	4.6 – 7.8	475,430	4.2	2.4 – 6.1
Farm workers and other agricultural workers	222,703	5.0	1.8 – 8.2	49,655	-	-	94,436	2.8	0.5 – 5.1
Health technologist and technicians	889,100	4.9	3.4 – 6.4	267,158	6.7	3.7 – 9.8	332,399	6.1	3.7 – 8.4
Technologist and technicians except health	519,699	4.8	3.1 – 6.6	141,367	4.3	1.3 – 7.4	185,022	5.1	2.4 – 7.9
Health assessment and treating occupations	1,891,276	4.5	3.6 – 5.4	609,435	5.4	3.6 – 7.3	399,501	4.4	2.4 – 6.3
Managers and administrators, except public administration	2,865,633	4.5	3.7 – 5.2	1,075,062	5.6	4.2 – 6.9	1,166,159	4.0	2.9 – 5.1
Other administrative support	5,106,381	4.5	4.0 – 5.1	1,390,390	5.7	4.5 – 6.9	1,827,172	3.8	3.0 – 4.6
Financial records processing	1,098,535	4.4	2.6 – 6.1	371,249	4.1	2.2 – 6.0	423,950	5.1	3.1 – 7.0
Supervisors and proprietors	812,965	4.4	2.9 – 5.8	300,593	5.0	2.4 – 7.6	424,163	4.1	2.3 – 6.0
Personal service	1,405,968	4.3	3.1 – 5.4	397,473	8.6	5.7 – 11.6	460,906	4.1	2.3 – 5.8
Computer equipment operators	127,759	4.3	0.5 – 8.1	34,268	4.5	0.0 – 9.5	43,075	3.5	0.0 – 8.3
Health diagnosing	232,484	4.3	1.3 – 7.3	42,299	7.4	0.2 – 14.5	22,309	-	-
Writers, artists, entertainers, and athletes	692,906	4.2	2.8 – 5.7	261,168	5.5	2.9 – 8.1	172,638	2.9	0.8 – 5.0
Other protective service	148,231	4.1	1.3 – 7.0	35,050	8.8	0.0 – 18.2	81,632	9.6	3.9 – 15.3
Health service	1,336,120	4.1	2.9 – 5.2	342,732	7.1	4.4 – 9.8	674,356	7.1	5.2 – 9.0
Other sales	2,235,985	4.0	3.0 – 4.9	539,443	4.6	2.9 – 6.4	1,033,304	6.0	4.5 – 7.4
Management related	1,804,092	4.0	3.1 – 5.0	570,587	5.6	3.8 – 7.5	583,354	3.2	2.0 – 4.5
Architects and surveyors	33,126	4.0	0.0 – 9.6	3,977	-	-	3,543	-	-
Secretaries, stenographers, and typists	1,609,775	3.9	3.0 – 4.9	498,587	5.6	3.5 – 7.6	508,695	4.1	2.2 – 6.0
Mechanics and repairers	98,179	3.7	0.0 – 7.4	42,676	8.1	0.1 – 16.0	65,010	7.4	1.4 – 13.4
Food service	1,561,496	3.5	2.6 – 4.5	402,155	4.4	2.5 – 6.4	1,210,298	5.8	4.5 – 7.2
Motor vehicle operators	259,178	3.5	1.5 – 5.4	84,885	9.3	3.5 – 15.1	160,657	5.5	2.2 – 8.8
Sales representatives, commodities and finance	890,693	3.5	2.2 – 4.7	321,575	3.2	1.4 – 5.0	359,762	4.4	2.4 – 6.4
Natural mathematical and computer scientists	554,934	3.5	2.1 – 4.8	145,870	6.2	2.6 – 9.8	99,027	4.4	0.4 – 8.3

See footnotes at end of table.

Table 9-25 (page 2 of 2). Asthma attack in past 12 months: Estimated prevalence by current occupation and smoking status, U.S. female residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Cleaning and building service	856,612	3.3	2.1 – 4.4	163,847	5.4	1.8 – 9.0	400,609	4.8	3.0 – 6.6
Construction and extractive trades	56,976	2.9	0.0 – 7.1	23,240	8.2	0.0 – 23.1	72,338	3.9	0.0 – 8.0
Mail and message distributing	195,479	2.6	0.6 – 4.6	83,788	5.5	1.3 – 9.6	94,557	4.1	0.1 – 8.1
Fabricators, assemblers, inspectors and samplers	588,217	2.5	1.2 – 3.9	137,116	6.1	2.4 – 9.7	271,781	2.7	1.1 – 4.4
Precision production	429,435	2.3	1.0 – 3.6	140,321	5.1	1.2 – 8.9	239,975	4.8	2.1 – 7.6
Machine operators and tenderers, except precision	852,992	2.2	1.2 – 3.3	196,545	3.3	0.9 – 5.6	431,808	3.1	1.3 – 4.9
Freight, stock and material handlers	525,591	2.1	0.9 – 3.3	90,544	2.5	0.0 – 5.0	296,607	2.9	1.2 – 4.6
Private household	431,023	1.8	0.6 – 2.9	104,321	6.9	1.6 – 12.2	117,937	5.7	0.0 – 11.5
Farm operators and managers	100,037	1.0	0.0 – 3.0	26,660	5.9	0.0 – 13.8	28,396	4.6	0.0 – 11.1
Material moving equipment operators	29,822	1.0	0.0 – 2.9	13,351	4.4	0.0 – 12.9	32,397	3.8	0.0 – 9.5
Construction laborers	10,386	-	-	2,396	-	-	13,780	12.4	0.0 – 30.5
Other transportation, except motor vehicles	1,572	-	-	648	-	-	2,080	11.2	0.0 – 33.9
Forestry and fishing	2,648	-	-	1,869	-	-	821	-	-
Military	2,844	-	-	1,586	-	-	1,971	-	-
Refused, not ascertained, don't know	1,428,577	2.0	1.4 – 2.7	238,781	5.3	2.8 – 7.7	333,188	3.7	1.8 – 5.5
TOTAL	**36,791,650**	**4.1**	**3.9 – 4.3**	**10,443,887**	**5.5**	**5.1 – 6.0**	**13,492,003**	**4.6**	**4.2 – 4.9**

- No estimates due to no asthma cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Section 10

Chronic Obstructive Pulmonary Disease

Table 10-1. Chronic obstructive pulmonary disease: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states, 1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
041	Coal mining	783	2.0	1.8	2.1
410	Trucking service	1,281	1.3	1.2	1.4
050	Nonmetallic mining and quarrying, except fuel	77	1.3	1.0	1.6
751	Automotive repair and related services	627	1.3	1.2	1.4
040	Metal mining	115	1.3	1.0	1.5
230	Logging	172	1.3	1.1	1.5
042	Oil and gas extraction	129	1.2	1.0	1.5
641	Eating and drinking places	1,373	1.2	1.2	1.3
760	Miscellaneous repair services	183	1.2	1.1	1.4
060	Construction	4,288	1.2	1.2	1.2
242	Furniture and fixtures	335	1.2	1.1	1.3
762	Hotels and motels	335	1.2	1.1	1.3
771	Laundry, cleaning, and garment services	257	1.2	1.0	1.3
802	Miscellaneous entertainment and recreation services	291	1.2	1.0	1.3
832	Nursing and personal care facilities	310	1.1	1.0	1.3
942	Military	855	1.1	1.0	1.2
142	Yarn, thread, and fabric mills	1,423	1.1	1.0	1.1
831	Hospitals	1,380	1.1	1.0	1.1

CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of chronic obstructive pulmonary disease deaths in the selected states for this same time period was 57,073, and the comparable number of chronic obstructive pulmonary disease deaths in the entire United States for this same time period was 245,415. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 10-2. Chronic obstructive pulmonary disease: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states, 1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
764	Washing, cleaning, and pickling machine operators	10	2.4	1.1	4.3
864	Helpers, mechanics and repairers	9	2.2	1.0	4.2
743	Textile cutting machine operators	11	2.0	1.0	3.6
616	Mining machine operators	768	2.0	1.9	2.2
599	Construction trades, n.e.c.	69	1.8	1.4	2.3
617	Mining occupations, n.e.c.	28	1.8	1.2	2.6
853	Excavating and loading machine operators	28	1.7	1.2	2.5
595	Roofers	71	1.7	1.3	2.1
435	Waiters and waitresses	434	1.6	1.5	1.8
573	Drywall installers	33	1.5	1.0	2.1
709	Grinding, abrading, buffing, and polishing machine operators	53	1.4	1.1	1.9
747	Pressing machine operators	70	1.4	1.1	1.8
888	Hand packers and packagers	84	1.4	1.1	1.7
885	Garage and service station related occupations	44	1.4	1.0	1.9
579	Painters, construction and maintenance	308	1.4	1.2	1.5
727	Sawing machine operators	63	1.3	1.0	1.7
507	Bus, truck, and stationary engine mechanics	149	1.3	1.1	1.5
514	Automobile body and related repairers	66	1.3	1.0	1.7
567	Carpenters	938	1.3	1.2	1.4
783	Welders and cutters	351	1.3	1.2	1.4
496	Timber cutting and logging occupations	135	1.3	1.1	1.5
804	Truck drivers	1,617	1.3	1.2	1.3
869	Construction laborers	664	1.3	1.2	1.4
844	Operating engineers	318	1.2	1.1	1.4
505	Automobile mechanics	499	1.2	1.1	1.4
585	Plumbers, pipefitters, and steamfitters	326	1.2	1.1	1.3
889	Laborers, except construction	1,586	1.2	1.1	1.2
447	Nursing aides, orderlies, and attendants	569	1.2	1.1	1.3
449	Maids and housemen	176	1.2	1.0	1.4
777	Miscellaneous machine operators, n.e.c.	293	1.2	1.0	1.3
479	Farm workers	217	1.2	1.0	1.3
563	Brickmasons and stonemasons	186	1.2	1.0	1.3
436	Cooks	484	1.2	1.1	1.3
779	Machine operators, not specified	632	1.1	1.1	1.2
905	Military occupations	746	1.1	1.0	1.2

COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of chronic obstructive pulmonary disease deaths in the selected states for this same time period was 57,073, and the comparable number of chronic obstructive pulmonary disease deaths in the entire United States for this same time period was 245,415. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 10-3. Chronic obstructive pulmonary disease: Estimated prevalence by current industry, U.S. residents age 18 and over, 1997–2004

Industry	Estimated Population	Prevalence (%)	95% Confidence Interval
Other educational services	564,502	5.9	3.7 – 8.1
Social services, religious and membership organizations	4,795,978	5.6	4.9 – 6.2
Private households	860,227	5.1	3.6 – 6.7
Health services, except hospitals	7,130,434	5.1	4.6 – 5.6
General merchandise stores	2,289,128	5.1	4.2 – 6.0
Other personal services	3,213,006	4.9	4.1 – 5.6
Textile mill and finished textile products	1,189,333	4.6	3.4 – 5.8
Food, bakery and dairy stores	2,849,542	4.5	3.7 – 5.3
Eating and drinking places	5,859,920	4.5	3.9 – 5.1
Transportation equipment	2,267,223	4.4	3.5 – 5.2
Business services	7,134,653	4.3	3.9 – 4.8
Elementary and secondary schools and colleges	10,775,110	4.3	3.9 – 4.7
Other and not specified retail trade	6,387,434	4.2	3.7 – 4.7
Mining	492,923	4.2	2.1 – 6.3
Other transportation	2,923,721	4.2	3.5 – 4.9
Other and not specified durable goods	2,095,107	4.1	3.2 – 5.0
Banking and credit agencies	2,835,520	4.0	3.2 – 4.7
Repair services	1,932,012	3.9	3.0 – 4.9
Public administration	6,199,357	3.9	3.5 – 4.4
Primary metal industry	746,402	3.9	2.4 – 5.4
Machinery, except electrical	2,034,373	3.9	3.0 – 4.7
Hospitals	5,260,506	3.9	3.3 – 4.4
Printing publishing and allied industries	1,624,590	3.8	2.9 – 4.8
Insurance, real estate and other finance	5,600,118	3.8	3.3 – 4.3
Utilities and sanitary	1,411,762	3.7	2.7 – 4.7
Entertainment and recreation services	2,337,336	3.6	2.8 – 4.5
Forestry and fisheries	163,467	3.6	0.0 – 7.3
Furniture, lumber and wood	1,444,925	3.6	2.4 – 4.7
Other nondurable goods	1,532,316	3.6	2.6 – 4.6
Electrical machinery, equipment and supplies	1,620,253	3.6	2.6 – 4.5
Wholesale trade	4,205,388	3.5	2.9 – 4.0
Communications	1,925,957	3.4	2.6 – 4.2
Automotive dealers and gasoline stations	2,005,723	3.4	2.6 – 4.2
Chemicals and allied products	1,205,561	3.4	2.3 – 4.5
Trucking service and warehousing	2,497,242	3.3	2.6 – 4.0
Legal, engineering and other professional services	4,923,739	3.3	2.8 – 3.8
Food and kindred products	1,879,890	3.2	2.2 – 4.2
Construction	9,137,436	2.9	2.5 – 3.3
Agriculture	2,992,257	2.8	2.2 – 3.4
Fabricated metal industries, including ordnance	1,087,197	2.8	1.7 – 3.8
Armed forces (excludes Reserves and National Guard)	33,960	1.3	0.0 – 3.9
Railroads	283,429	1.2	0.1 – 2.3
Refused, not ascertained, don't know	4,562,408	2.3	1.8 – 2.7
TOTAL	**132,311,362**	**4.0**	**3.8 – 4.1**

NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-4. Chronic obstructive pulmonary disease: Estimated prevalence by current industry, U.S. male residents age 18 and over, 1997–2004

Industry	Estimated Population	Prevalence (%)	95% Confidence Interval
Forestry and fisheries	127,964	4.6	0.0 – 9.3
Mining	434,376	4.1	1.8 – 6.4
Other educational services	182,072	4.1	0.5 – 7.7
Transportation equipment	1,716,134	3.9	2.9 – 4.9
Social services, religious and membership organizations	1,279,205	3.7	2.6 – 4.8
Primary metal industry	641,803	3.6	2.0 – 5.3
Textile mill and finished textile products	552,242	3.6	1.9 – 5.3
Other personal services	1,162,388	3.6	2.5 – 4.6
Furniture, lumber and wood	1,095,157	3.5	2.2 – 4.8
Business services	4,084,511	3.5	2.9 – 4.1
Repair services	1,726,775	3.3	2.3 – 4.3
Machinery, except electrical	1,572,963	3.1	2.2 – 4.0
Printing publishing and allied industries	944,693	3.0	1.7 – 4.2
Food, bakery and dairy stores	1,335,039	3.0	1.9 – 4.0
Utilities and sanitary	1,140,025	2.9	1.9 – 3.9
Food and kindred products	1,286,961	2.9	1.6 – 4.2
Other nondurable goods	1,116,743	2.8	1.7 – 3.9
Elementary and secondary schools and colleges	3,408,822	2.8	2.2 – 3.4
Other and not specified retail trade	3,063,880	2.8	2.1 – 3.4
Hospitals	1,241,064	2.8	1.7 – 3.8
Trucking service and warehousing	2,041,530	2.7	2.0 – 3.5
Entertainment and recreation services	1,355,116	2.7	1.7 – 3.7
Construction	8,288,151	2.6	2.3 – 3.0
Legal, engineering and other professional services	2,634,476	2.6	2.0 – 3.3
General merchandise stores	818,985	2.6	1.5 – 3.7
Automotive dealers and gasoline stations	1,483,377	2.6	1.7 – 3.5
Eating and drinking places	2,715,174	2.6	1.9 – 3.3
Wholesale trade	3,000,102	2.6	2.0 – 3.2
Other and not specified durable goods	1,396,893	2.6	1.7 – 3.5
Other transportation	1,856,690	2.6	1.8 – 3.3
Agriculture	2,305,795	2.5	1.8 – 3.1
Insurance, real estate and other finance	2,633,959	2.5	1.9 – 3.1
Chemicals and allied products	803,248	2.4	1.3 – 3.6
Public administration	3,403,896	2.4	1.9 – 3.0
Fabricated metal industries, including ordnance	855,347	2.4	1.3 – 3.4
Health services, except hospitals	1,453,541	2.3	1.5 – 3.1
Communications	1,135,867	2.1	1.3 – 3.0
Banking and credit agencies	913,167	1.9	1.0 – 2.9
Electrical machinery, equipment and supplies	1,036,872	1.9	1.1 – 2.8
Armed forces (excludes Reserves and National Guard)	24,397	1.8	0.0 – 5.4
Railroads	262,163	1.1	0.0 – 2.2
Private households	62,342	0.8	0.0 – 2.5
Refused, not ascertained, don't know	2,517,978	1.4	1.0 – 1.9
TOTAL	**71,111,881**	**2.7**	**2.6 – 2.9**

NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-5. Chronic obstructive pulmonary disease: Estimated prevalence by current industry, U.S. female residents age 18 and over, 1997–2004

Industry	Estimated Population	Prevalence (%)	95% Confidence Interval
Repair services	205,237	9.2	5.6 – 12.9
Utilities and sanitary	271,738	7.2	4.0 – 10.3
Other and not specified durable goods	698,214	7.1	5.1 – 9.0
Other transportation	1,067,031	6.9	5.5 – 8.4
Other educational services	382,430	6.8	4.1 – 9.5
Machinery, except electrical	461,410	6.6	4.5 – 8.7
Electrical machinery, equipment and supplies	583,382	6.5	4.3 – 8.7
General merchandise stores	1,470,142	6.5	5.2 – 7.8
Social services, religious and membership organizations	3,516,773	6.2	5.4 – 7.0
Eating and drinking places	3,144,746	6.1	5.2 – 7.0
Food, bakery and dairy stores	1,514,503	5.9	4.7 – 7.1
Health services, except hospitals	5,676,893	5.9	5.2 – 6.5
Trucking service and warehousing	455,711	5.8	3.9 – 7.8
Other nondurable goods	415,574	5.8	3.5 – 8.0
Transportation equipment	551,089	5.8	4.1 – 7.4
Public administration	2,795,461	5.7	4.9 – 6.5
Other personal services	2,050,618	5.6	4.6 – 6.6
Automotive dealers and gasoline stations	522,345	5.6	3.7 – 7.5
Wholesale trade	1,205,286	5.6	4.3 – 6.8
Other and not specified retail trade	3,323,553	5.6	4.8 – 6.4
Business services	3,050,143	5.5	4.7 – 6.3
Private households	797,885	5.5	3.8 – 7.1
Textile mill and finished textile products	637,092	5.5	3.8 – 7.2
Construction	849,285	5.4	3.7 – 7.1
Primary metal industry	104,600	5.3	1.6 – 9.1
Chemicals and allied products	402,313	5.3	2.9 – 7.6
Communications	790,090	5.2	3.7 – 6.7
Printing publishing and allied industries	679,897	5.1	3.6 – 6.5
Insurance, real estate and other finance	2,966,159	5.1	4.3 – 5.8
Banking and credit agencies	1,922,353	5.0	4.0 – 6.0
Elementary and secondary schools and colleges	7,366,288	5.0	4.5 – 5.5
Entertainment and recreation services	982,220	4.9	3.3 – 6.6
Mining	58,548	4.5	0.3 – 8.6
Fabricated metal industries, including ordnance	231,849	4.4	1.6 – 7.3
Hospitals	4,019,442	4.2	3.6 – 4.9
Legal, engineering and other professional services	2,289,263	4.0	3.3 – 4.8
Food and kindred products	592,929	4.0	2.5 – 5.4
Agriculture	686,462	3.9	2.4 – 5.5
Furniture, lumber and wood	349,768	3.9	1.3 – 6.5
Railroads	21,267	3.2	0.0 – 7.8
Forestry and fisheries	35,503	0.0	-
Armed forces (excludes Reserves and National Guard)	9,563	0.0	-
Refused, not ascertained, don't know	2,044,430	3.3	2.6 – 4.0
TOTAL	**61,199,481**	**5.4**	**5.2 – 5.4**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-6. Chronic obstructive pulmonary disease: Estimated prevalence by current occupation, U.S. residents age 18 and over, 1997–2004

Occupation	Estimated Population	Prevalence (%)	95% Confidence Interval
Health service	2,653,011	7.3	6.3 – 8.4
Financial records processing	2,115,805	5.8	4.8 – 6.9
Personal service	2,765,854	5.8	5.0 – 6.7
Secretaries, stenographers, and typists	2,684,933	5.7	4.8 – 6.6
Other administrative support	11,363,017	5.1	4.7 – 5.5
Private household	691,069	5.1	3.3 – 6.9
Food service	5,386,163	5.1	4.4 – 5.7
Other protective service	968,782	5.0	3.6 – 6.3
Cleaning and building service	3,101,428	4.8	4.0 – 5.5
Other sales	6,178,105	4.7	4.1 – 5.2
Health technologist and technicians	1,866,864	4.6	3.7 – 5.5
Fabricators, assemblers, inspectors and samplers	2,654,166	4.6	3.7 – 5.4
Material moving equipment operators	1,181,359	4.3	2.9 – 5.7
Motor vehicle operators	4,031,519	4.2	3.5 – 4.8
Supervisors and proprietors	3,864,657	4.1	3.4 – 4.7
Teachers, librarians, and counselors	6,949,300	4.1	3.6 – 4.5
Machine operators and tenderers, except precision	4,400,009	4.0	3.4 – 4.6
Officials and administrators, public administration	778,000	3.9	2.6 – 5.2
Management related	5,123,439	3.9	3.3 – 4.4
Precision production	3,405,364	3.7	3.0 – 4.4
Writers, artists, entertainers, and athletes	2,321,769	3.7	2.9 – 4.4
Other professional specialty	2,952,973	3.6	2.9 – 4.3
Sales representatives, commodities and finance	4,238,483	3.6	3.0 – 4.1
Freight, stock and material handlers	3,848,042	3.6	2.9 – 4.2
Health assessment and treating occupations	3,353,106	3.5	2.9 – 4.2
Mail and message distributing	890,721	3.5	2.3 – 4.8
Managers and administrators, except public administration	12,517,663	3.4	3.1 – 3.7
Mechanics and repairers	4,692,046	3.2	2.7 – 3.8
Farm workers and other agricultural workers	1,994,542	2.8	2.0 – 3.5
Technologist and technicians except health	2,658,737	2.8	2.2 – 3.4
Construction and extractive trades	5,829,786	2.7	2.3 – 3.1
Natural mathematical and computer scientists	2,649,991	2.6	2.0 – 3.2
Police and firefighters	1,452,583	2.4	1.6 – 3.2
Farm operators and managers	893,227	2.4	1.4 – 3.4
Engineers	1,990,104	2.4	1.6 – 3.1
Construction laborers	1,065,269	2.3	1.5 – 3.2
Forestry and fishing	158,696	2.3	0.0 – 4.9
Other transportation, except motor vehicles	192,922	2.3	0.1 – 4.5
Military	22,962	1.9	0.0 – 5.7
Architects and surveyors	230,282	1.9	0.2 – 3.6
Computer equipment operators	378,791	1.5	0.2 – 2.8
Health diagnosing	1,060,786	1.3	0.5 – 2.0
Refused, not ascertained, don't know	4,755,041	2.4	2.0 – 2.8
TOTAL	**132,311,362**	**4.0**	**3.8 – 4.1**

NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-7. Chronic obstructive pulmonary disease: Estimated prevalence by current occupation, U.S. male residents age 18 and over, 1997–2004

Occupation	Estimated Population	Prevalence (%)	95% Confidence Interval
Private household	35,450	6.6	0.0 – 16.5
Personal service	487,213	4.7	2.6 – 6.7
Cleaning and building service	1,667,648	4.4	3.4 – 5.5
Material moving equipment operators	1,104,408	4.4	2.9 – 5.8
Other protective service	702,846	4.3	2.8 – 5.7
Financial records processing	213,438	3.8	0.7 – 6.9
Fabricators, assemblers, inspectors and samplers	1,653,379	3.7	2.7 – 4.7
Other administrative support	2,996,623	3.5	2.8 – 4.2
Health assessment and treating occupations	433,914	3.5	1.2 – 5.8
Motor vehicle operators	3,518,996	3.4	2.8 – 4.0
Health service	286,971	3.3	1.2 – 5.5
Freight, stock and material handlers	2,931,348	3.1	2.4 – 3.8
Machine operators and tenderers, except precision	2,914,187	3.1	2.4 – 3.8
Precision production	2,591,182	3.1	2.4 – 3.8
Supervisors and proprietors	2,320,253	3.0	2.2 – 3.8
Mechanics and repairers	4,485,332	3.0	2.4 – 3.6
Management related	2,156,992	2.7	2.0 – 3.4
Military	16,561	2.7	0.0 – 8.0
Construction and extractive trades	5,674,943	2.7	2.2 – 3.1
Food service	2,202,137	2.6	1.8 – 3.4
Farm workers and other agricultural workers	1,625,054	2.6	1.8 – 3.4
Health technologist and technicians	373,730	2.6	0.9 – 4.2
Other sales	2,359,261	2.5	1.8 – 3.3
Writers, artists, entertainers, and athletes	1,192,122	2.5	1.5 – 3.4
Teachers, librarians, and counselors	2,177,803	2.4	1.8 – 3.1
Managers and administrators, except public administration	7,389,366	2.4	2.1 – 2.8
Forestry and fishing	153,358	2.4	0.0 – 5.1
Construction laborers	1,038,707	2.4	1.5 – 3.3
Farm operators and managers	738,134	2.3	1.2 – 3.3
Other professional specialty	1,500,087	2.3	1.5 – 3.0
Sales representatives, commodities and finance	2,656,538	2.2	1.7 – 2.8
Other transportation, except motor vehicles	188,622	2.2	0.0 – 4.5
Officials and administrators, public administration	406,991	2.2	0.8 – 3.6
Natural mathematical and computer scientists	1,847,198	2.1	1.5 – 2.8
Mail and message distributing	515,279	2.1	0.7 – 3.5
Police and firefighters	1,231,087	2.1	1.2 – 3.0
Engineers	1,786,291	2.1	1.3 – 2.8
Technologist and technicians except health	1,809,092	2.1	1.4 – 2.7
Architects and surveyors	189,636	1.9	0.0 – 3.9
Computer equipment operators	173,689	1.7	0.0 – 4.2
Secretaries, stenographers, and typists	60,762	1.1	0.0 – 3.2
Health diagnosing	763,693	0.8	0.1 – 1.5
Refused, not ascertained, don't know	2,541,564	1.4	0.9 – 1.8
TOTAL	**71,111,881**	**2.7**	**2.6 – 2.9**

NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-8. Chronic obstructive pulmonary disease: Estimated prevalence by current occupation, U.S. female residents age 18 and over, 1997–2004

Occupation	Estimated Population	Prevalence (%)	95% Confidence Interval
Motor vehicle operators	512,524	9.6	7.1 – 12.1
Mechanics and repairers	206,714	8.2	4.1 – 12.4
Health service	2,366,040	7.8	6.7 – 8.9
Food service	3,184,026	6.8	5.8 – 7.7
Other protective service	265,936	6.8	4.0 – 9.5
Personal service	2,278,641	6.1	5.1 – 7.0
Financial records processing	1,902,368	6.1	4.9 – 7.2
Other sales	3,818,844	6.0	5.2 – 6.8
Fabricators, assemblers, inspectors and samplers	1,000,786	6.0	4.6 – 7.4
Officials and administrators, public administration	371,010	5.9	3.6 – 8.1
Machine operators and tenderes except precision	1,485,822	5.8	4.7 – 7.0
Sales representatives, commodities and finance	1,581,945	5.8	4.7 – 6.9
Secretaries, stenographers, and typists	2,624,172	5.8	4.9 – 6.7
Supervisors and proprietors	1,544,405	5.7	4.5 – 6.9
Other administrative support	8,366,394	5.7	5.2 – 6.2
Precision production	814,181	5.6	4.0 – 7.3
Mail and message distributing	375,442	5.5	3.3 – 7.7
Other transportation, except motor vehicles	4,300	5.4	0.0 – 16.2
Cleaning and building service	1,433,779	5.1	4.1 – 6.2
Health technologist and technicians	1,493,134	5.1	4.0 – 6.2
Private household	655,619	5.0	3.2 – 6.8
Freight, stock and material handlers	916,695	5.0	3.6 – 6.3
Writers, artists, entertainers, and athletes	1,129,647	4.9	3.7 – 6.1
Other professional specialty	1,452,885	4.9	3.8 – 6.1
Managers and administrators, except public administration	5,128,297	4.8	4.2 – 5.4
Teachers, librarians, and counselors	4,771,497	4.8	4.1 – 5.4
Engineers	203,813	4.7	2.1 – 7.3
Management related	2,966,447	4.7	4.0 – 5.4
Construction and extractive trades	154,843	4.4	1.3 – 7.5
Technologist and technicians except health	849,645	4.2	3.0 – 5.5
Police and firefighters	221,496	4.0	1.9 – 6.2
Natural mathematical and computer scientists	802,793	3.8	2.6 – 5.0
Material moving equipment operators	76,951	3.6	0.0 – 8.4
Health assessment and treating occupations	2,919,192	3.6	2.9 – 4.2
Farm workers and other agricultural workers	369,488	3.5	1.6 – 5.5
Farm operators and managers	155,093	2.9	0.0 – 5.8
Health diagnosing	297,093	2.4	0.5 – 4.3
Architects and surveyors	40,646	2.1	0.0 – 5.1
Computer equipment operators	205,102	1.3	0.2 – 2.4
Forestry and fishing	5,338	0.0	-
Construction laborers	26,562	0.0	-
Military	6,401	0.0	-
Refused, not ascertained, don't know	2,213,477	3.6	2.8 – 4.3
TOTAL	**61,199,481**	**5.4**	**5.2 – 5.5**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-9 (page 1 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current industry and smoking status, U.S. residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Social services, religious and membership organizations	2,929,887	4.6	3.8 – 5.4	997,488	5.1	3.9 – 6.4	856,384	9.3	7.4 – 11.2
General merchandise stores	1,338,543	4.4	3.2 – 5.6	378,568	4.6	2.6 – 6.6	564,831	7.1	5.0 – 9.2
Other educational services	349,521	3.9	2.0 – 5.8	137,436	3.6	1.3 – 6.0	76,686	19.3	7.8 – 30.9
Furniture lumber and wood	687,181	3.6	1.8 – 5.4	273,578	3.1	1.0 – 5.3	477,650	3.9	1.9 – 5.9
Elementary and secondary schools and colleges	7,403,629	3.4	3.0 – 3.8	2,006,838	5.0	4.0 – 6.0	1,331,719	8.1	6.6 – 9.6
Banking and credit agencies	1,774,282	3.4	2.6 – 4.3	505,637	4.0	2.1 – 5.8	546,342	5.9	3.8 – 8.0
Health services, except hospitals	4,223,076	3.2	2.6 – 3.7	1,326,263	5.1	3.9 – 6.3	1,544,834	10.5	9.0 – 12.0
Machinery except electrical	1,012,010	3.2	2.1 – 4.3	465,639	2.2	0.9 – 3.4	548,260	6.6	4.4 – 8.8
Other and not specific retail trade	3,590,839	3.2	2.6 – 3.9	1,242,711	5.4	4.1 – 6.7	1,529,268	5.7	4.5 – 6.8
Other personal services	1,677,270	3.1	2.3 – 3.9	607,780	6.0	4.1 – 7.9	913,108	7.4	5.7 – 9.1
Printing publishing and allied industries	818,225	3.1	1.9 – 4.3	371,680	3.9	1.9 – 5.9	433,901	5.3	3.2 – 7.4
Food bakery and diary stores	1,529,495	2.9	2.1 – 3.8	446,161	5.0	3.0 – 7.0	861,970	7.2	5.3 – 9.0
Hospitals	3,324,236	2.9	2.2 – 3.5	1,010,271	4.4	3.0 – 5.8	905,288	7.1	5.5 – 8.7
Public administration	3,574,583	2.9	2.4 – 3.4	1,406,952	4.0	3.0 – 5.1	1,188,101	6.9	5.6 – 8.3
Repair services	774,785	2.9	1.5 – 4.2	442,147	3.4	1.6 – 5.2	699,141	5.5	3.7 – 7.4
Utilities and sanitary	732,957	2.9	1.6 – 4.3	338,656	4.0	2.0 – 6.1	333,734	5.2	2.9 – 7.5
Other transportation	1,521,462	2.8	2.0 – 3.6	709,055	4.3	2.9 – 5.6	677,128	7.1	5.1 – 9.0
Forestry and fisheries	81,726	2.8	0.0 – 8.2	43,598	8.3	0.0 – 17.4	37,505	-	-
Wholesale trade	2,137,682	2.7	2.0 – 3.4	954,117	4.1	2.8 – 5.3	1,089,183	4.5	3.3 – 5.7
Business services	3,966,894	2.6	2.1 – 3.1	1,366,126	4.6	3.4 – 5.7	1,768,692	8.2	6.8 – 9.5
Insurance, real estate and other finance	3,172,430	2.6	2.1 – 3.2	1,249,100	4.5	3.4 – 5.7	1,155,766	6.4	4.9 – 7.8
Legal, engineering and other professional services	3,010,317	2.6	2.0 – 3.1	1,098,736	3.5	2.4 – 4.5	792,748	5.8	4.2 – 7.3
Transportation equipment	1,108,314	2.5	1.6 – 3.3	557,412	3.5	1.9 – 5.0	598,574	8.7	6.3 – 11.2
Entertainment and recreation services	1,376,824	2.5	1.4 – 3.6	438,085	5.4	3.3 – 7.5	518,092	5.2	3.0 – 7.4
Eating and drinking places	2,885,257	2.4	1.8 – 3.0	695,747	4.5	2.6 – 6.4	2,249,022	7.2	6.1 – 8.3

See footnotes at end of table.

Table 10-9 (page 2 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current industry and smoking status, U.S. residents age 18 and over, 1997–2004

	Nonsmokers			Former Smokers			Current Smokers		
Industry	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Private households	543,427	2.3	1.2 – 3.4	136,039	10.6	4.5 – 16.7	177,152	9.7	5.4 – 14.0
Automotive dealers and gasoline stations	921,072	2.3	1.3 – 3.3	398,828	3.5	1.5 – 5.5	673,875	4.9	3.2 – 6.5
Textile mill and finished textile products	668,322	2.2	1.2 – 3.1	188,813	5.4	1.7 – 9.1	325,896	9.2	6.0 – 12.5
Chemicals and allied products	681,276	2.2	1.0 – 3.4	266,746	3.1	0.9 – 5.2	252,556	7.0	3.7 – 10.3
Food and kindred products	964,422	2.2	1.3 – 3.1	368,240	4.6	1.5 – 7.6	541,573	4.1	1.9 – 6.3
Other and non-specified durable goods	1,104,659	2.1	1.2 – 3.0	449,663	5.2	3.0 – 7.5	534,616	7.2	5.0 – 9.5
Communications	1,105,909	2.0	1.3 – 2.8	392,262	3.3	1.8 – 4.8	422,291	7.1	4.5 – 9.7
Other non-durable goods	707,693	2.0	0.8 – 3.1	367,915	4.7	2.5 – 6.9	452,834	5.3	3.0 – 7.5
Trucking service and warehousing	1,200,192	2.0	1.1 – 2.8	494,129	3.5	1.8 – 5.2	790,855	5.3	3.7 – 6.8
Agriculture	1,693,364	1.9	1.2 – 2.6	570,676	3.9	2.3 – 5.4	712,661	4.2	2.8 – 5.6
Electrical machinery, equipment and supplies	915,210	1.8	1.0 – 2.7	312,445	5.7	3.0 – 8.4	389,509	5.9	3.3 – 8.6
Mining	238,721	1.5	0.0 – 3.3	89,919	6.0	0.4 – 11.6	163,413	7.2	2.5 – 11.8
Construction	3,989,174	1.4	1.0 – 1.8	1,804,630	3.2	2.3 – 4.1	3,296,357	4.5	3.8 – 5.3
Fabricated metal industries, including ordinance	459,245	1.2	0.3 – 2.1	256,876	2.4	0.2 – 4.5	370,741	5.1	2.6 – 7.5
Primary metal industry	326,480	0.9	0.0 – 1.8	169,513	5.9	2.2 – 9.7	247,279	6.5	3.0 – 10.1
Armed forces (excludes Reserves and National Guard)	19,585	-	-	8,740	-	-	5,636	7.8	0.0 – 23.3
Railroads	123,505	-	-	76,471	0.4	0.0 – 1.2	79,725	4.0	0.2 – 7.8
Refused, not ascertained, don't know	2,725,395	1.5	1.1 – 2.0	557,858	4.3	2.6 – 5.9	747,114	4.3	2.9 – 5.7
TOTAL	**73,389,074**	**2.7**	**2.6 – 2.9**	**25,979,536**	**4.4**	**4.1 – 4.6**	**31,882,006**	**6.5**	**6.2 – 6.8**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-10 (page 1 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current industry and smoking status, U.S. male residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Forestry and fisheries	60,105	3.8	0.0 – 11.1	34,523	10.5	0.0 – 21.9	32,697	-	-
Social services, religious and membership organizations	720,702	3.3	1.8 – 4.7	340,194	4.0	2.0 – 6.1	213,433	4.8	1.9 – 7.8
Furniture lumber and wood	488,909	3.1	1.3 – 4.9	226,169	3.4	1.0 – 5.9	373,564	4.1	1.7 – 6.5
Other educational services	91,214	3.0	0.0 – 6.8	58,862	1.3	0.0 – 3.8	31,996	12.3	0.0 – 28.1
Machinery except electrical	749,288	2.7	1.4 – 3.9	380,228	1.9	0.5 – 3.2	437,389	4.9	2.6 – 7.2
Repair services	664,977	2.6	1.1 – 4.1	411,488	3.1	1.3 – 5.0	635,920	4.3	2.5 – 6.1
Hospitals	751,886	2.5	1.0 – 3.9	278,750	2.0	0.4 – 3.7	204,907	4.7	1.9 – 7.6
Utilities and sanitary	581,915	2.5	1.2 – 3.9	282,516	4.0	1.8 – 6.2	271,493	2.7	0.9 – 4.5
Elementary and secondary schools and colleges	2,226,028	2.4	1.7 – 3.1	713,192	2.9	1.7 – 4.1	457,917	4.6	2.5 – 6.6
Legal, engineering and other professional services	1,592,890	2.3	1.5 – 3.1	642,719	2.9	1.6 – 4.2	387,374	3.6	1.8 – 5.4
Food, bakery, and dairy stores	727,379	2.2	0.9 – 3.4	237,988	1.6	0.3 – 2.9	361,525	5.6	2.8 – 8.4
Other personal services	520,249	2.2	1.0 – 3.5	268,906	3.7	1.6 – 5.7	367,235	5.4	3.0 – 7.9
Transportation equipment	821,861	2.1	1.1 – 3.1	450,435	3.6	1.8 – 5.4	441,287	7.7	4.8 – 10.6
Other and not specific retail trade	1,627,518	2.1	1.2 – 3.0	646,741	4.0	2.3 – 5.6	775,766	3.3	2.0 – 4.5
Printing publishing and allied industries	436,865	1.9	0.3 – 3.5	227,159	4.2	1.4 – 7.0	280,669	3.6	1.2 – 6.1
Private households	28,358	1.9	0.0 – 5.5	8,885	-	-	25,100	-	-
Business services	2,224,308	1.8	1.2 – 2.4	834,921	4.7	3.2 – 6.2	1,002,631	6.3	4.6 – 8.0
Insurance, real estate and other finance	1,449,079	1.8	1.1 – 2.6	673,128	2.7	1.5 – 3.9	501,032	3.9	2.2 – 5.7
Automotive dealers and gasoline stations	683,611	1.7	0.6 – 2.7	323,637	3.6	1.3 – 5.9	467,205	3.4	1.6 – 5.2
Eating and drinking places	1,352,606	1.7	0.9 – 2.5	333,229	4.3	1.0 – 7.6	1,010,197	3.3	2.1 – 4.4
Wholesale trade	1,436,503	1.7	1.0 – 2.4	737,203	3.7	2.3 – 5.2	804,606	3.3	2.0 – 4.5
Banking and credit agencies	532,216	1.7	0.7 – 2.8	194,239	3.1	0.0 – 6.1	182,624	1.3	0.0 – 3.2
Trucking service and warehousing	956,866	1.6	0.7 – 2.4	427,023	3.0	1.3 – 4.8	647,821	4.3	2.6 – 6.0
Communications	630,177	1.6	0.7 – 2.5	251,026	1.6	0.3 – 2.9	252,357	4.1	1.5 – 6.8
Entertainment and recreation services	796,115	1.6	0.7 – 2.5	252,015	4.8	2.2 – 7.3	305,929	3.9	1.0 – 6.8

See footnotes at end of table.

Table 10-10 (page 2 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current industry and smoking status, U.S. male residents age 18 and over, 1997–2004

Industry	Nonmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
General merchandise stores	441,285	1.6	0.4 – 2.7	171,617	4.2	1.2 – 7.3	203,740	3.6	1.1 – 6.0
Electrical machinery, equipment and supplies	586,945	1.6	0.6 – 2.6	212,249	2.3	0.5 – 4.1	235,722	2.4	0.2 – 4.6
Other transportation	898,448	1.5	0.6 – 2.4	502,733	2.4	1.1 – 3.7	447,574	4.8	2.8 – 6.9
Public administration	1,913,905	1.5	1.0 – 2.0	876,657	3.5	2.2 – 4.8	594,293	3.8	2.2 – 5.4
Agriculture	1,268,745	1.5	0.7 – 2.2	461,568	4.0	2.2 – 5.7	561,362	3.7	2.2 – 5.2
Food and kindred products	608,220	1.5	0.6 – 2.4	286,064	4.7	1.0 – 8.5	387,603	3.7	0.8 – 6.5
Chemicals and allied products	438,417	1.3	0.2 – 2.4	195,022	1.4	0.0 – 2.9	165,918	6.7	2.7 – 10.7
Other and non-specified durable goods	694,378	1.3	0.4 – 2.1	323,603	3.7	1.3 – 6.1	373,867	4.1	2.1 – 6.1
Construction	3,557,211	1.2	0.8 – 1.6	1,649,806	2.7	1.9 – 3.6	3,041,470	4.3	3.5 – 5.0
Other non-durable goods	494,180	1.2	0.0 – 2.3	300,751	4.3	1.9 – 6.7	320,082	3.8	1.4 – 6.3
Mining	204,301	1.1	0.0 – 3.0	80,906	6.2	0.0 – 12.3	148,298	7.3	2.2 – 12.4
Textile mill and finished textile products	265,252	1.1	0.0 – 2.2	120,345	6.9	1.4 – 12.4	161,601	5.4	1.8 – 8.9
Health services, except hospitals	897,406	0.9	0.2 – 1.5	320,868	2.4	0.5 – 4.2	230,733	7.6	4.2 – 11.0
Primary metal industry	280,072	0.8	0.0 – 1.8	145,923	6.6	2.3 – 11.0	212,678	5.3	1.6 – 9.1
Fabricated metal industries, including ordinance	350,276	0.8	0.0 – 1.8	207,868	2.8	0.2 – 5.4	296,869	3.9	1.5 – 6.2
Armed forces (excludes Reserves and National Guard)	14,026	-	-	7,154	-	-	3,218	13.7	0.0 – 40.7
Railroads	111,392	-	-	72,740	0.4	0.0 – 1.2	74,998	3.3	0.0 – 7.2
Refused, not ascertained, don't know	1,389,565	0.7	0.3 – 1.1	353,380	3.2	1.3 – 5.0	447,825	3.2	1.7 – 4.7
TOTAL	**36,565,645**	**1.8**	**1.6 – 1.9**	**15,524,427**	**3.4**	**3.1 – 3.7**	**18,380,521**	**4.3**	**4.0 – 4.6**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-11 (page 1 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current industry and smoking status, U.S. female residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
General merchandise stores	897,258	5.8	4.2 – 7.5	206,951	4.9	2.1 – 7.6	361,092	9.1	6.2 – 12.0
Social services, religious and membership organizations	2,209,184	5.0	4.0 – 6.0	657,294	5.7	4.1 – 7.3	642,951	10.8	8.5 – 13.1
Machinery except electrical	262,722	4.9	2.5 – 7.3	85,411	3.6	0.2 – 7.0	110,871	12.9	7.0 – 18.9
Furniture lumber and wood	198,272	4.8	0.6 – 8.9	47,409	1.7	0.0 – 5.0	104,087	3.3	0.0 – 6.6
Other transportation	623,015	4.7	3.2 – 6.3	206,322	8.7	5.3 – 12.2	229,554	11.5	7.4 – 15.6
Wholesale trade	701,178	4.7	3.1 – 6.3	216,914	5.1	2.5 – 7.7	284,577	8.2	5.3 – 11.0
Repair services	109,808	4.6	1.1 – 8.2	30,659	7.5	0.0 – 16.2	63,220	18.2	9.3 – 27.1
Utilities and sanitary	151,042	4.6	0.9 – 8.4	56,140	4.4	0.0 – 9.7	62,240	16.2	7.5 – 24.9
Public administration	1,660,678	4.5	3.5 – 5.4	530,295	5.0	3.2 – 6.7	593,808	10.1	7.9 – 12.3
Printing, publishing, and allied industries	381,360	4.4	2.6 – 6.3	144,521	3.4	0.9 – 5.9	153,233	8.3	4.5 – 12.1
Other educational services	258,307	4.2	2.0 – 6.4	78,574	5.4	1.8 – 9.0	44,690	24.4	8.5 – 40.3
Banking and credit agencies	1,242,065	4.2	3.0 – 5.3	311,398	4.5	2.2 – 6.9	363,718	8.2	5.2 – 11.2
Other and not specific retail trade	1,963,321	4.2	3.2 – 5.1	595,969	7.0	5.0 – 8.9	753,502	8.2	6.2 – 10.2
Automotive dealers and gasoline stations	237,462	4.2	1.5 – 6.8	75,192	3.3	0.0 – 6.6	206,670	8.1	4.6 – 11.7
Mining	34,420	3.9	0.0 – 9.4	9,012	4.8	0.0 – 14.1	15,115	5.7	0.0 – 14.0
Health services, except hospitals	3,325,671	3.8	3.2 – 4.5	1,005,395	6.0	4.5 – 7.5	1,314,102	11.1	9.4 – 12.7
Elementary and secondary schools and colleges	5,177,601	3.8	3.3 – 4.3	1,293,646	6.1	4.8 – 7.5	873,802	9.9	7.9 – 11.9
Other non-durable goods	213,513	3.8	1.2 – 6.5	67,164	6.4	1.4 – 11.4	132,752	8.7	3.7 – 13.6
Chemicals and allied products	242,859	3.8	1.3 – 6.3	71,724	7.5	0.8 – 14.2	86,638	7.5	1.7 – 13.4
Entertainment and recreation services	580,709	3.8	1.5 – 6.0	186,070	6.3	2.7 – 9.9	212,162	7.1	3.7 – 10.5
Transportation equipment	286,453	3.6	1.7 – 5.4	106,977	2.9	0.5 – 5.4	157,287	11.7	7.4 – 16.1
Business services	1,742,586	3.6	2.7 – 4.4	531,204	4.4	2.7 – 6.1	766,061	10.7	8.6 – 12.8
Food, bakery and dairy stores	802,117	3.6	2.4 – 4.8	208,173	9.0	5.1 – 12.9	500,444	8.3	5.8 – 10.8
Other and non-specified durable goods	410,281	3.5	1.7 – 5.3	126,059	9.2	4.0 – 14.4	160,749	14.5	9.0 – 20.0
Trucking service and warehousing	243,326	3.5	1.4 – 5.6	67,106	6.5	1.0 – 11.9	143,033	9.6	5.2 – 14.0

See footnotes at end of table.

Table 10-11 (page 2 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current industry and smoking status, U.S. female residents age 18 and over, 1997–2004

Industry	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Other personal services	1,157,021	3.5	2.5 – 4.5	338,875	7.9	5.0 – 10.8	545,874	8.7	6.4 – 11.1
Food and kindred products	356,202	3.5	1.6 – 5.3	82,176	4.0	0.6 – 7.3	153,969	5.3	2.1 – 8.4
Insurance, real estate and other finance	1,723,351	3.3	2.5 – 4.1	575,972	6.7	4.6 – 8.7	654,735	8.2	6.1 – 10.4
Agriculture	424,619	3.2	1.3 – 5.2	109,108	3.5	0.0 – 7.2	151,299	6.1	2.5 – 9.7
Eating and drinking places	1,532,651	3.0	2.1 – 4.0	362,518	4.7	2.8 – 6.6	1,238,825	10.4	8.6 – 12.2
Hospitals	2,572,350	3.0	2.3 – 3.6	731,521	5.3	3.5 – 7.1	700,381	7.8	5.9 – 9.7
Construction	431,963	3.0	1.3 – 4.7	154,824	8.4	2.8 – 14.1	254,887	7.8	4.5 – 11.0
Textile mill and finished textile products	403,070	2.9	1.4 – 4.3	68,468	2.7	0.0 – 6.0	164,295	13.0	7.8 – 18.3
Legal, engineering and other professional services	1,417,427	2.9	2.0 – 3.7	456,017	4.2	2.4 – 6.0	405,375	7.8	5.4 – 10.2
Communications	475,732	2.6	1.3 – 4.0	141,236	6.3	2.9 – 9.8	169,933	11.5	6.5 – 16.5
Fabricated metal industries, including ordinance	108,970	2.4	0.2 – 4.6	49,008	0.6	0.0 – 1.7	73,872	10.0	2.1 – 17.9
Electrical machinery, equipment and supplies	328,265	2.3	0.7 – 3.9	100,196	13.0	5.9 – 20.1	153,787	11.4	5.7 – 17.0
Private households	515,069	2.3	1.2 – 3.5	127,154	11.3	4.8 – 17.8	152,052	11.3	6.4 – 16.3
Primary metal industry	46,408	1.0	0.0 – 3.1	23,590	1.6	0.0 – 4.7	34,601	13.7	3.3 – 24.1
Railroads	12,112	-	-	3,731	-	-	4,727	14.4	0.0 – 34.5
Forestry and fisheries	21,621	-	-	9,074	-	-	4,808	-	-
Armed forces (excludes Reserves and National Guard)	5,559	-	-	1,586	-	-	2,418	-	-
Refused, not ascertained, don't know	1,335,830	2.4	1.6 – 3.2	204,478	6.1	3.2 – 9.1	299,289	6.0	3.4 – 8.6
TOTAL	**36,823,429**	**3.7**	**3.5 – 3.9**	**10,455,109**	**5.9**	**5.4 – 6.3**	**13,501,485**	**9.5**	**9.0 – 10.0**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-12 (page 1 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current occupation and smoking status, U.S. residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Secretaries, stenographers, and typists	1,647,055	4.5	3.5 – 5.6	511,196	4.1	2.6 – 5.7	520,023	10.8	8.1 – 13.6
Financial records processing	1,225,524	4.1	2.9 – 5.3	408,038	7.2	4.3 – 10.1	471,378	9.2	6.7 – 11.8
Personal service	1,671,660	3.8	2.9 – 4.8	505,212	7.9	5.6 – 10.2	574,309	9.8	7.4 – 12.2
Other administrative support	6,753,696	3.8	3.3 – 4.3	1,993,188	5.4	4.4 – 6.4	2,568,045	8.3	7.2 – 9.4
Health service	1,478,898	3.7	2.7 – 4.8	388,825	8.8	5.8 – 11.8	771,352	13.6	11.2 – 16.0
Officials and administrators, public administration	431,561	3.7	2.1 – 5.4	227,573	3.6	1.2 – 6.0	116,922	5.5	1.8 – 9.1
Teachers, librarians, and counselors	4,948,667	3.4	2.8 – 3.9	1,266,336	4.3	3.2 – 5.3	715,063	8.4	6.3 – 10.6
Fabricators, assemblers, inspectors and samplers	1,313,583	3.4	2.3 – 4.4	485,050	3.3	1.8 – 4.8	848,301	7.2	5.3 – 9.0
Other professional specialty	1,839,553	3.3	2.4 – 4.2	746,857	2.2	1.2 – 3.2	353,436	7.5	5.1 – 9.9
Supervisors and proprietors	1,999,234	3.3	2.4 – 4.1	865,136	4.8	3.3 – 6.3	983,403	5.2	3.8 – 6.5
Other sales	3,502,285	3.2	2.5 – 3.9	996,598	5.2	3.8 – 6.6	1,650,012	7.6	6.3 – 8.9
Management related	3,083,012	3.1	2.5 – 3.7	1,091,049	4.1	3.0 – 5.2	942,661	6.1	4.6 – 7.5
Writers, artists, entertainers, and athletes	1,375,809	3.1	2.2 – 4.0	530,710	4.5	2.7 – 6.4	409,918	4.5	2.6 – 6.4
Cleaning and building service	1,629,226	2.9	2.1 – 3.8	539,140	5.3	3.4 – 7.2	914,771	7.9	6.1 – 9.6
Other protective service	482,828	2.9	1.4 – 4.3	204,308	6.4	3.2 – 9.6	277,467	7.6	4.7 – 10.5
Health assessment and treating occupations	2,159,987	2.9	2.1 – 3.6	714,893	4.3	2.7 – 6.0	460,559	5.7	3.9 – 7.5
Architects and surveyors	139,408	2.9	0.1 – 5.7	59,655	-	-	30,361	1.3	0.0 – 3.8
Food service	2,639,156	2.8	2.1 – 3.5	661,352	6.1	4.1 – 8.1	2,065,809	7.7	6.4 – 8.9
Health technologist and technicians	1,118,460	2.7	1.8 – 3.6	331,759	4.8	2.5 – 7.1	411,523	9.7	7.0 – 12.5
Sales representatives, commodities and finance	2,333,049	2.6	2.0 – 3.2	1,037,844	4.1	2.9 – 5.3	851,895	5.5	4.0 – 7.0
Machine operators and tenderers, except precision	2,116,782	2.5	1.9 – 3.2	783,434	3.4	2.1 – 4.7	1,487,895	6.4	5.1 – 7.8
Managers and administrators, except public administration	6,742,102	2.5	2.1 – 2.8	2,993,673	3.5	2.8 – 4.1	2,735,852	5.8	4.9 – 6.7
Private household	447,868	2.3	1.1 – 3.4	110,594	11.4	4.1 – 18.6	130,476	9.6	4.1 – 15.1
Freight, stock and material handlers	2,076,217	2.3	1.6 – 2.9	514,471	3.9	2.1 – 5.7	1,237,022	5.7	4.3 – 7.0
Motor vehicle operators	1,717,097	2.3	1.6 – 3.0	921,745	5.7	4.1 – 7.2	1,367,693	5.6	4.3 – 6.8

See footnotes at end of table.

Table 10-12 (page 2 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current occupation and smoking status, U.S. residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Natural mathematical and computer scientists	1,726,080	2.2	1.5 – 2.8	559,678	3.4	1.9 – 5.0	354,239	3.8	1.9 – 5.6
Technologist and technicians except health	1,569,047	2.1	1.4 – 2.8	550,469	3.0	1.6 – 4.4	530,464	4.6	2.9 – 6.3
Mail and message distributing	460,542	2.0	0.8 – 3.2	220,229	3.0	1.2 – 4.8	208,084	7.4	3.4 – 11.4
Material moving equipment operators	497,904	1.9	0.6 – 3.2	258,145	4.4	1.7 – 7.1	415,126	7.2	4.1 – 10.3
Precision production	1,516,041	1.8	1.2 – 2.4	809,275	3.7	2.3 – 5.1	1,065,793	6.4	4.8 – 8.0
Engineers	1,319,393	1.7	0.8 – 2.5	418,724	3.0	1.4 – 4.5	248,887	5.0	2.5 – 7.5
Farm workers and other agricultural workers	1,061,841	1.7	0.8 – 2.6	331,277	4.0	1.9 – 6.1	586,400	4.0	2.6 – 5.5
Mechanics and repairers	1,987,325	1.6	1.0 – 2.2	1,187,400	4.6	3.1 – 6.0	1,496,680	4.4	3.2 – 5.6
Construction and extractive trades	2,446,680	1.4	0.9 – 1.9	1,102,800	3.1	2.0 – 4.2	2,252,697	4.0	3.2 – 4.9
Police and firefighters	883,103	1.3	0.6 – 2.1	296,303	3.8	1.6 – 6.1	264,605	4.3	1.4 – 7.2
Computer equipment operators	232,805	1.3	0.0 – 3.0	68,947	-	-	72,501	3.7	0.0 – 7.5
Farm operators and managers	543,609	1.0	0.2 – 1.8	209,737	4.8	1.9 – 7.6	136,582	4.2	0.8 – 7.7
Construction laborers	491,231	0.8	0.0 – 1.6	170,385	3.5	0.8 – 6.2	392,515	3.8	2.1 – 5.5
Health diagnosing	791,649	0.7	0.1 – 1.3	211,441	2.1	0.3 – 3.9	54,515	6.7	0.0 – 15.3
Military	10,579	-	-	7,194	-	-	5,189	8.5	0.0 – 25.4
Other transportation, except motor vehicles	85,616	-	-	52,319	-	-	54,987	8.1	0.6 – 15.6
Forestry and fishing	62,589	-	-	33,360	4.0	0.0 – 11.5	61,495	3.8	0.0 – 9.1
Refused, classified, not ascertained, don't know	2,830,322	1.8	1.3 – 2.3	603,219	4.5	2.9 – 6.1	785,103	4.0	2.7 – 5.3
TOTAL	**73,389,074**	**2.7**	**2.6 – 2.9**	**25,979,536**	**4.4**	**4.1 – 4.6**	**31,882,006**	**6.5**	**6.2 – 6.8**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-13 (page 1 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current occupation and smoking status, U.S. male residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Health assessment and treating occupations	266,133	3.3	0.1 – 6.5	105,458	3.0	0.0 – 6.4	61,057	5.3	0.0 – 11.1
Private household	16,639	3.2	0.0 – 9.3	6,273	-	-	12,539	14.4	0.0 – 39.9
Architects and surveyors	106,282	3.0	0.0 – 6.5	55,679	0.0	0.0 – 0.0	26,818	1.5	0.0 – 4.3
Cleaning and building service	770,123	2.9	1.7 – 4.2	372,619	5.0	2.8 – 7.3	513,867	6.4	4.2 – 8.6
Financial records processing	126,989	2.7	0.0 – 5.6	36,289	-	-	47,428	9.8	0.0 – 20.8
Personal service	262,401	2.7	0.6 – 4.8	107,086	6.6	2.1 – 11.1	113,402	7.6	1.7 – 13.4
Other protective service	334,597	2.7	0.8 – 4.6	169,258	5.6	2.4 – 8.7	195,834	5.9	2.7 – 9.1
Fabricators, assemblers, inspectors and samplers	725,366	2.5	1.2 – 3.8	347,934	2.0	0.5 – 3.6	575,251	6.2	3.9 – 8.4
Other administrative support	1,645,339	2.4	1.6 – 3.2	602,798	4.0	2.5 – 5.5	739,051	5.6	3.8 – 7.4
Other sales	1,265,216	2.4	1.3 – 3.6	457,155	3.0	1.3 – 4.7	616,122	2.5	1.3 – 3.7
Machine operators and tenderers, except precision	1,261,403	2.2	1.3 – 3.1	586,889	2.7	1.3 – 4.1	1,056,088	4.4	3.0 – 5.7
Management related	1,276,453	2.2	1.3 – 3.0	519,443	2.8	1.5 – 4.1	359,307	4.1	2.0 – 6.2
Supervisors and proprietors	1,186,269	2.2	1.2 – 3.1	562,384	4.6	2.7 – 6.4	559,240	3.3	1.7 – 4.9
Teachers, librarians, and counselors	1,478,263	2.1	1.3 – 2.8	454,889	2.6	1.2 – 4.0	239,180	4.6	1.4 – 7.7
Other professional specialty	929,846	2.1	1.1 – 3.1	415,843	2.0	0.6 – 3.4	147,738	4.1	1.6 – 6.6
Writers, artists, entertainers, and athletes	682,903	2.0	0.9 – 3.1	269,542	3.2	1.0 – 5.4	237,280	3.1	0.6 – 5.5
Officials and administrators, public administration	211,360	2.0	0.2 – 3.9	138,113	3.0	0.0 – 5.9	55,574	1.0	0.0 – 3.0
Motor vehicle operators	1,455,594	1.9	1.1 – 2.6	836,860	4.9	3.4 – 6.5	1,207,036	4.1	3.0 – 5.3
Computer equipment operators	105,046	1.9	0.0 – 5.4	34,679	-	-	29,427	3.6	0.0 – 10.4
Freight, stock and material handlers	1,550,627	1.8	1.1 – 2.6	423,927	3.6	1.7 – 5.6	940,416	5.1	3.6 – 6.6
Secretaries, stenographers, and typists	36,824	1.8	0.0 – 5.3	12,609	-	-	11,328	-	-
Material moving equipment operators	468,082	1.7	0.5 – 2.9	244,794	4.5	1.6 – 7.3	382,728	7.7	4.4 – 11.0
Engineers	1,168,355	1.7	0.8 – 2.6	390,963	2.7	1.1 – 4.4	224,853	3.2	1.1 – 5.3
Managers and administrators, except public administration	3,874,063	1.6	1.2 – 2.0	1,917,436	2.7	1.9 – 3.5	1,568,857	4.2	3.0 – 5.3

See footnotes at end of table.

Table 10-13 (page 2 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current occupation and smoking status, U.S. male residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Food service	1,075,914	1.6	0.8 – 2.5	259,196	3.6	0.0 – 7.3	855,512	3.6	2.2 – 5.0
Technologist and technicians except health	1,048,132	1.6	0.8 – 2.4	408,722	2.5	1.0 – 4.0	345,442	3.0	1.1 – 4.8
Precision production	1,086,607	1.5	0.8 – 2.1	668,954	3.5	2.0 – 5.1	823,845	4.8	3.2 – 6.4
Mechanics and repairers	1,889,146	1.5	0.9 – 2.2	1,144,724	4.5	3.0 – 6.0	1,431,671	3.8	2.7 – 4.9
Farm workers and other agricultural workers	838,887	1.5	0.6 – 2.4	281,622	4.4	2.0 – 6.9	490,999	3.6	2.0 – 5.1
Sales representatives, commodities and finance	1,440,892	1.5	0.9 – 2.1	715,112	2.9	1.6 – 4.1	492,132	3.5	1.8 – 5.1
Natural mathematical and computer scientists	1,170,625	1.5	0.8 – 2.2	413,808	3.9	1.9 – 5.9	255,212	2.4	0.6 – 4.2
Construction and extractive trades	2,389,704	1.4	0.9 – 1.9	1,079,560	2.9	1.8 – 4.0	2,180,360	3.9	3.1 – 4.8
Police and firefighters	750,317	1.3	0.5 – 2.1	264,568	3.9	1.4 – 6.3	208,727	2.9	0.0 – 6.0
Health technologist and technicians	229,360	1.1	0.0 – 2.5	64,601	2.6	0.0 – 6.5	79,124	6.8	1.4 – 12.3
Health service	142,779	0.8	0.0 – 2.4	46,093	-	-	96,996	8.7	2.9 – 14.5
Farm operators and managers	443,572	0.8	0.0 – 1.6	183,077	4.0	1.4 – 6.7	108,186	5.3	1.0 – 9.7
Construction laborers	480,846	0.8	0.0 – 1.7	167,989	3.6	0.8 – 6.3	378,735	3.9	2.1 – 5.7
Health diagnosing	559,165	0.6	0.0 – 1.3	169,141	1.2	0.0 – 2.6	32,205	3.1	0.0 – 9.0
Mail and message distributing	265,063	0.4	0.0 – 1.2	136,442	2.4	0.3 – 4.6	113,527	5.7	0.5 – 10.8
Military	7,735	-	-	5,609	-	-	3,218	13.7	0.0 – 40.7
Other transportation, except motor vehicles	84,043	-	-	51,671	-	-	52,907	8.0	0.3 – 15.7
Forestry and fishing	59,941	-	-	31,491	4.2	0.0 – 12.2	60,674	3.9	0.0 – 9.2
Refused, classified, not ascertained, don't know	1,398,747	1.0	0.5 – 1.5	363,129	2.9	1.1 – 4.7	450,633	2.4	1.1 – 3.8
TOTAL	**36,565,645**	**1.8**	**1.6 – 1.9**	**15,524,427**	**3.4**	**3.1 – 3.7**	**18,380,521**	**4.3**	**4.0 – 4.6**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Table 10-14 (page 1 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current occupation and smoking status, U.S. female residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Material moving equipment operators	29,822	5.9	0.0 – 17.0	13,351	3.2	0.0 – 9.5	32,397	1.8	0.0 – 5.4
Officials and administrators, public administration	220,201	5.4	2.6 – 8.2	89,460	4.5	0.4 – 8.7	61,349	9.5	3.0 – 16.0
Supervisors and proprietors	812,965	4.9	3.3 – 6.5	302,753	5.2	2.8 – 7.7	424,163	7.6	5.1 – 10.1
Motor vehicle operators	261,503	4.8	2.4 – 7.2	84,885	12.7	5.8 – 19.6	160,657	16.2	0.5 – 21.9
Secretaries, stenographers, and typists	1,610,231	4.6	3.5 – 5.7	498,587	4.3	2.6 – 5.9	508,695	11.1	8.3 – 13.9
Other professional specialty	909,707	4.5	3.0 – 6.0	331,015	2.5	1.1 – 3.9	205,699	9.9	6.2 – 13.6
Fabricators, assemblers, inspectors and samplers	588,217	4.4	2.7 – 6.2	137,116	6.4	2.7 – 10.1	273,050	9.3	6.1 – 12.4
Sales representatives, commodities and finance	892,157	4.4	3.0 – 5.7	322,732	6.8	4.1 – 9.5	359,762	8.3	5.6 – 11.0
Mail and message distributing	195,479	4.3	1.7 – 6.9	83,788	3.9	0.6 – 7.2	94,557	9.5	3.3 – 15.8
Other administrative support	5,108,357	4.3	3.7 – 4.8	1,390,390	6.0	4.8 – 7.3	1,828,994	9.4	8.0 – 10.7
Financial records processing	1,098,535	4.3	3.0 – 5.5	371,749	7.9	4.8 – 11.1	423,950	9.2	6.6 – 11.7
Writers, artists, entertainers, and athletes	692,906	4.2	2.8 – 5.6	261,168	5.9	2.9 – 8.9	172,638	6.4	3.3 – 9.5
Health service	1,336,120	4.1	3.0 – 5.2	342,732	10.0	6.6 – 13.4	674,356	14.3	11.7 – 17.0
Personal service	1,409,260	4.0	3.0 – 5.1	398,126	8.2	5.5 – 10.9	460,906	10.3	7.7 – 12.9
Teachers, librarians, and counselors	3,470,404	3.9	3.2 – 4.6	811,447	5.2	3.7 – 6.7	475,883	10.4	7.5 – 13.2
Management related	1,806,559	3.7	2.9 – 4.5	571,607	5.3	3.5 – 7.1	583,354	7.2	5.3 – 9.2
Other sales	2,237,069	3.6	2.8 – 4.5	539,443	7.1	5.0 – 9.3	1,033,890	10.6	8.7 – 12.5
Food service	1,563,242	3.6	2.6 – 4.7	402,155	7.7	5.3 – 10.0	1,210,298	10.5	8.7 – 12.4
Managers and administrators, except public administration	2,868,040	3.6	2.9 – 4.2	1,076,238	4.8	3.6 – 6.0	1,166,996	8.0	6.4 – 9.5
Freight, stock and material handlers	525,591	3.6	2.1 – 5.1	90,544	5.1	0.9 – 9.3	296,607	7.4	4.5 – 10.3
Natural mathematical and computer scientists	555,456	3.6	2.2 – 5.1	145,870	2.1	0.5 – 3.7	99,027	7.3	2.6 – 12.0
Other protective service	148,231	3.2	0.8 – 5.5	35,050	10.4	0.0 – 21.2	81,632	11.7	5.7 – 17.8
Health technologist and technicians	889,100	3.1	2.0 – 4.2	267,158	5.3	2.6 – 8.1	332,399	10.4	7.3 – 13.6
Mechanics and repairers	98,179	3.0	0.0 – 6.5	42,676	6.6	0.0 – 13.2	65,010	17.3	6.6 – 28.0
Machine operators and tenderers, except precision	855,380	3.0	2.0 – 4.0	196,545	5.6	2.3 – 8.8	431,808	11.5	8.5 – 14.5

See footnotes at end of table.

Table 10-14 (page 2 of 2). Chronic obstructive pulmonary disease: Estimated prevalence by current occupation and smoking status, U.S. female residents age 18 and over, 1997–2004

Occupation	Nonsmokers			Former Smokers			Current Smokers		
	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval	Estimated Population	Prevalence (%)	95% Confidence Interval
Technologist and technicians except health	520,915	3.0	1.6 – 4.3	141,747	4.4	1.2 – 7.6	185,022	7.7	4.3 – 11.2
Cleaning and Building service	859,103	2.9	1.8 – 4.0	166,521	5.8	2.3 – 9.3	400,905	9.7	7.1 – 12.3
Health assessment and treating occupations	1,893,854	2.8	2.1 – 3.5	609,435	4.6	2.7 – 6.4	399,501	5.7	3.8 – 7.7
Precision production	429,435	2.7	1.3 – 4.1	140,321	4.4	0.6 – 8.2	241,948	11.7	7.3 – 16.2
Farm workers and other agricultural workers	222,954	2.7	0.2 – 5.2	49,655	1.6	0.0 – 4.6	95,402	6.6	2.0 – 11.1
Architects and surveyors	33,126	2.6	0.0 – 6.2	3,977	-	-	3,543	-	-
Private household	431,229	2.2	1.0 – 3.4	104,321	12.0	4.4 – 19.7	117,937	9.1	3.6 – 14.5
Police and firefighters	132,786	1.9	0.4 – 3.4	31,735	3.4	0.0 – 8.3	55,878	9.7	2.5 – 16.8
Farm operators and managers	100,037	1.9	0.0 – 4.4	26,660	9.9	0.0 – 23.1	28,396	-	-
Engineers	151,038	1.7	0.0 – 3.5	27,760	5.9	0.0 – 12.5	24,035	22.4	7.0 – 37.7
Health diagnosing	232,484	0.9	0.0 – 1.8	42,299	5.7	0.0 – 12.3	22,309	12.0	0.0 – 30.5
Computer equipment operators	127,759	0.8	0.0 – 1.7	34,268	0.0	0.0 – 0.0	43,075	3.8	0.0 – 8.1
Construction and extractive trades	56,976	0.4	0.0 – 1.1	23,240	9.5	0.0 – 23.1	72,338	6.1	1.4 – 10.8
Other transportation, except motor vehicles	1,572	-	-	648	-	-	2,080	11.2	0.0 – 33.9
Forestry and fishing	2,648	-	-	1,869	-	-	821	-	-
Construction laborers	10,386	-	-	2,396	-	-	13,780	-	-
Military	2,844	-	-	1,586	-	-	1,971	-	-
Refused, classified, not ascertained, don't know	1,431,575	2.7	1.9 – 3.4	240,090	6.9	3.9 – 9.9	334,469	6.0	3.6 – 8.5
TOTAL	**36,823,429**	**3.7**	**3.5 – 3.9**	**10,455,109**	**5.9**	**5.4 – 6.3**	**13,501,485**	**9.5**	**9.0 – 10.0**

- No estimates due to no chronic obstructive pulmonary disease cases or no respondents.
NOTE: See appendices for source description, methods, and ICD codes.
SOURCE: National Center for Health Statistics National Health Interview Survey.

Section 11

Respiratory Conditions Due to Toxic Agents

Table 11-1a. Occupational respiratory conditions due to toxic agents: Estimated number of cases reported by employers by industry, U.S. private sector, 1973–2001

Year	Agriculture	Mining	Construction	Manufacturing	Transportation & Public Utilities	Wholesale & Retail Trade	Finance	Services	All Industries
1973	100	-	1,000	7,300	700	1,100	100	1,100	11,500
1974	200	100	900	8,500	700	1,200	100	1,000	12,700
1975	200	100	900	7,100	900	1,400	300	1,100	11,900
1976	200	100	1,100	7,700	1,100	1,000	200	1,600	13,100
1977	100	-	1,100	7,500	1,100	1,400	100	1,700	13,100
1978	100	100	1,100	7,900	1,100	1,600	200	1,600	13,600
1979	100	100	1,100	7,800	900	1,300	200	1,700	13,100
1980	100	100	700	6,700	1,000	1,300	100	1,300	11,400
1981	100	100	1,000	5,900	800	1,100	100	1,600	10,800
1982	100	100	600	4,700	700	700	100	1,600	8,800
1983	100	100	700	4,000	600	700	100	1,700	7,900
1984	100	100	700	5,500	700	1,200	200	2,100	10,600
1985	200	100	800	6,000	900	1,400	400	1,800	11,600
1986	100	-	600	6,400	700	1,600	400	2,400	12,300
1987	700	-	700	7,500	900	1,700	400	2,400	14,300
1988	200	100	900	9,200	1,000	1,300	500	3,000	16,100
1989	100	-	700	9,900	800	3,500	300	3,500	18,900
1990	200	100	1,200	10,300	1,200	2,200	800	4,700	20,500
1991	300	-	800	8,800	1,100	1,600	700	4,800	18,300
1992	400	100	1,000	10,000	1,100	3,300	900	6,800	23,500
1993	300	100	800	10,100	2,000	3,000	1,500	6,400	24,200
1994	200	100	900	11,000	1,700	3,000	800	7,700	25,300
1995	200	100	800	9,400	1,800	2,900	1,400	7,900	24,400
1996	200	-	600	7,800	1,800	2,000	700	8,500	21,700
1997	400	-	700	7,500	1,600	2,300	900	6,800	20,300
1998	500	-	800	6,600	1,200	2,600	600	5,100	17,500
1999	300	-	600	6,600	1,800	1,700	500	5,000	16,500
2000	100	-	500	5,500	1,000	1,700	600	5,400	14,700
2001	100	-	500	4,100	1,400	1,900	700	5,900	14,500

- indicates no data reported or data that do not meet BLS publication guidelines.
NOTE: After 2001, BLS stopped using the 'respiratory conditions' category for its annual surveys. See appendices for source description and method.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 11-1b. Occupational respiratory conditions due to toxic agents: Estimated rate (based on cases reported by employers, per 10,000 full-time workers) by industry, U.S. private sector, 1973–2001

Year	Agriculture	Mining	Construction	Manufacturing	Transportation & Public Utilities	Wholesale & Retail Trade	Finance	Services	Overall
1973	1.8	1.7	3.2	3.8	1.7	0.8	0.2	1.2	2.1
1974	2.4	0.9	3.0	4.4	1.6	0.8	0.2	0.9	2.2
1975	1.7	0.8	3.1	4.1	2.1	1.0	0.7	1.1	2.2
1976	3.1	1.6	3.7	4.3	2.6	0.7	0.5	1.5	2.3
1977	2.0	0.5	3.3	4.0	2.5	0.9	0.2	1.4	2.2
1978	2.2	0.8	2.9	4.0	2.4	1.0	0.6	1.3	2.2
1979	1.1	0.8	2.8	3.9	1.9	0.8	0.5	1.3	2.0
1980	2.0	0.8	2.0	3.5	2.0	0.8	0.2	1.0	1.8
1981	1.1	1.0	2.9	3.1	1.7	0.7	0.2	1.1	1.7
1982	1.7	0.5	1.9	2.7	1.5	0.5	0.3	1.1	1.4
1983	1.4	0.8	2.0	2.3	1.4	0.4	0.2	1.1	1.2
1984	1.5	0.9	1.8	2.9	1.4	0.7	0.5	1.3	1.6
1985	2.4	1.0	1.9	3.2	1.8	0.8	0.8	1.1	1.7
1986	1.3	-	1.5	3.5	1.5	0.9	0.6	1.4	1.7
1987	7.9	0.6	1.6	4.0	1.7	0.9	0.7	1.3	2.0
1988	2.1	0.7	2.0	4.9	1.9	0.6	0.9	1.6	2.2
1989	1.5	0.5	1.5	5.2	1.6	1.7	0.5	1.7	2.5
1990	1.6	0.7	2.6	5.6	2.2	1.1	-	2.2	2.7
1991	2.7	0.6	2.1	5.0	2.1	0.8	-	2.3	2.4
1992	3.8	1.3	2.4	5.6	2.1	1.6	1.4	3.1	3.1
1993	2.5	0.9	2.0	5.6	3.7	1.5	2.5	2.8	3.1
1994	1.8	1.2	1.9	6.0	3.0	1.4	1.2	3.3	3.1
1995	1.4	1.5	1.7	5.1	3.2	1.3	2.3	3.4	3.0
1996	1.7	0.3	1.2	4.2	3.1	0.9	1.2	3.5	2.6
1997	2.7	0.6	1.4	4.0	2.7	1.0	1.4	2.7	2.4
1998	3.7	0.8	1.4	3.5	2.0	1.1	1.0	1.9	2.0
1999	1.8	0.6	1.0	3.6	2.8	0.7	0.8	1.9	1.8
2000	0.8	0.4	0.9	3.0	1.5	0.7	0.9	1.9	1.6
2001	0.4	0.3	0.8	2.4	2.1	0.8	1.0	2.1	1.6

- indicates no data reported or data that do not meet BLS publication guidelines.
NOTE: After 2001, BLS stopped using the 'respiratory conditions' category for its annual surveys. See appendices for source description and method.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 11-2. Respiratory conditions: Estimated number and rate (based on cases reported by employers, per 10,000 full-time workers) by industry, U.S. private sector, 2003–2004

Industry (NAICS)	Number of Cases		Incidence Rate	
	2003	2004	2003	2004
Natural resources and mining (11, 21)	300	200	2.2	1.7
Construction (23)	900	600	1.6	1.0
Manufacturing (31–33)	3,600	3,800	2.5	2.6
Trade, transportation, and utilities (22, 42, 44–45, 48–49)	2,900	2,900	1.3	1.3
Information (51)	200	300	0.6	1.0
Financial activities (52)	800	600	1.1	0.9
Professional and business services (53–56, 72, 92)	-	1,600	-	1.3
Education and health services (61, 62)	6,700	6,000	5.4	4.8
Leisure and hospitality (71)	1,400	1,100	1.7	1.4
Other services (81)	300	500	1.0	1.7
ALL INDUSTRIES	**19,000**	**17,600**	**2.2**	**2.0**

- indicates no data reported or data that do not meet BLS publication guidelines.
NAICS - North American Industry Classification System
NOTE: In 2003–2004, work-related respiratory illnesses (with days away from work) for transportation and public utilities and wholesale and retail trade were combined. See appendices for source description and method.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 11-3 (page 1 of 2). Occupational respiratory conditions due to toxic agents: Industries with the highest estimated incidence rates (based on cases reported by employers, per 10,000 full-time workers), U.S. private sector, 1996–2001

Year/Industry	SIC	Estimated Number of Cases	Rate (per 10,000 full-time workers)
1996			
Transportation equipment	37	3,000	11.2
Fishing, hunting, and trapping	09	-	7.4
Health services	80	5,200	6.9
Hotels and other lodging places	70	900	6.3
Food and kindred products	20	1,000	5.7
Primary metal industries	33	400	4.8
Communications	48	600	4.7
Fabricated metal products	34	700	4.7
Chemicals and allied products	28	500	4.5
Leather and leather products	31	-	4.5
Rubber and miscellaneous plastic products	30	400	4.5
ALL INDUSTRIES		**21,700**	**2.6**
1997			
Fishing, hunting, and trapping	09	-	15.7
Leather and leather products	31	100	15.2
Transportation equipment	37	1,900	10.1
Museums, botanical, zoological gardens	84	100	9.7
Instruments and related products	38	400	5.0
Food and kindred products	20	800	5.0
Electronic and other electic equipment	36	800	4.6
Primary metal industries	33	300	4.4
Health services	80	3,400	4.4
Chemicals and allied products	28	400	4.3
ALL INDUSTRIES		**20,300**	**2.4**
1998			
Agricultural production-livestock	02	100	11.2
Transportation equipment	37	1,800	9.1
Primary metal industries	33	500	6.9
Food and kindred products	20	100	5.7
Fishing, hunting, and trapping	09	-	5.4
Furniture and fixtures	25	200	4.6
Electronic and other electic equipment	36	700	4.0
Amusement and recreation services	79	400	3.9
Health services	80	2,800	3.6
Transportation by air	45	400	3.6
ALL INDUSTRIES		**17,500**	**2.0**

See footnotes at end of table.

Table 11-3 (page 2 of 2). Occupational respiratory conditions due to toxic agents: Industries with the highest estimated incidence rates (based on cases reported by employers, per 10,000 full-time workers), U.S. private sector, 1996–2001

Year/Industry	SIC	Estimated Number of Cases	Rate (per 10,000 full-time workers)
1999			
Petroleum and coal products	29	100	9.8
Transportation equipment	37	1,700	8.7
Communications	48	900	5.9
Food and kindred products	20	1,000	5.8
Primary metal industries	33	300	4.7
Rubber and miscellaneous plastic products	30	400	4.2
Museums, botanical, zoological gardens	84	-	3.8
Electronic and other electric equipment	36	600	3.5
Health services	80	2,800	3.5
Chemicals and allied products	28	300	3.3
ALL INDUSTRIES		**16,500**	**1.8**
2000			
Transportation equipment	37	1,300	7.0
Food and kindred products	20	900	5.3
Health services	80	3,200	4.0
Primary metal industries	33	300	3.8
Petroleum and coal products	29	-	3.7
Instruments and related products	38	300	3.2
Chemicals and allied products	28	300	3.2
Stone, clay, and glass products	32	200	3.1
Agricultural production-livestock	02	-	3.0
Electronic and other electric equipment	36	500	3.0
ALL INDUSTRIES		**14,700**	**1.6**
2001			
Transportation equipment	37	1,000	5.9
Transportation by air	45	500	4.9
Local and interurban passenger transit	41	200	4.6
Health services	80	2,800	3.4
Food and kindred products	20	500	3.0
Instruments and related products	38	200	2.9
Electronic and other electric equipment	36	400	2.8
Primary metal industries	33	200	2.6
Chemical and allied products	28	300	2.5
Fabricated metal products	34	400	2.4
ALL INDUSTRIES		**14,500**	**1.6**

- indicates no data reported or data that do not meet BLS publication guidelines. SIC - Standard Industial Classification

NOTE: In 2002, "respiratory conditions due to toxic agents" (pneumonitis, pharyngitis, rhinitis or acute congestions due to chemicals, dusts, gases or fumes) was combined with 'dust diseases of the lungs' (silicosis, asbestosis, coal workers' pneumoconiosis, byssinosis, siderosis, and other pneumoconioses) to form a new condition called 'respiratory conditions.' See appendices for source description.

SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Section 12

Respiratory Tuberculosis

Table 12-1. Respiratory tuberculosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states and years, 1990–1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval LCL	95% Confidence Interval UCL
830	Offices and clinics of health practitioners, n.e.c.	13	2.9	1.6	5.0
141	Carpets and rugs	13	2.1	1.1	3.7
791	Miscellaneous personal services	33	1.9	1.3	2.7
050	Nonmetallic mining and quarrying, except fuel	16	1.9	1.1	3.0
040	Metal mining	17	1.8	1.1	2.9
750	Automotive services, except repair	17	1.8	1.0	2.9
280	Other primary metal industries	24	1.7	1.1	2.5
760	Miscellaneous repair services	35	1.5	1.1	2.1
010	Agricultural production, crops	436	1.5	1.3	1.6
990	Industry not reported	610	1.4	1.3	1.6
041	Coal mining	67	1.4	1.1	1.8
762	Hotels and motels	79	1.3	1.0	1.6
831	Hospitals	238	1.2	1.0	1.3
961	Non-paid worker or non-worker or own home/at home	1,531	1.1	1.0	1.1

CIC - Census Industry Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit

NOTE: The comparable total number of respiratory tuberculosis deaths in the selected states for this same time period was 8,071, and the comparable number of respiratory tuberculosis deaths in the entire United States for this same time period was 35,417. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.

SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 12-2. Respiratory tuberculosis: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states and years, 1990–1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
768	Crushing and grinding machine operators	11	3.3	1.7	6.0
829	Sailors and deckhands	11	2.2	1.1	4.0
434	Bartenders	20	2.0	1.2	3.2
534	Heating, air conditioning, and refrigeration mechanics	14	2.0	1.1	3.4
203	Clinical laboratory technologists and technicians	15	1.9	1.1	3.2
875	Garbage collectors	25	1.7	1.1	2.5
616	Mining machine operators	76	1.7	1.3	2.1
479	Farm workers	99	1.7	1.4	2.1
913	Retired, with no other occupation reported	33	1.5	1.0	2.1
449	Maids and housemen	60	1.4	1.1	1.9
917	Unemployed, never worked, disabled	246	1.3	1.2	1.5
999	Occupation not reported	527	1.3	1.2	1.4
869	Construction laborers	230	1.3	1.1	1.5
379	General office clerks	81	1.3	1.0	1.6
473	Farmers, except horticulture	358	1.3	1.1	1.4
567	Carpenters	138	1.2	1.0	1.4
889	Laborers, except construction	395	1.2	1.0	1.3

COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit

NOTE: The comparable total number of respiratory tuberculosis deaths in the selected states for this same time period was 8,071, and the comparable number of respiratory tuberculosis deaths in the entire United States for this same time period was 35,417. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states and years.

SOURCE: National Center for Health Statistics multiple cause-of-death data.

Section 13

Lung Cancer

Table 13-1. Lung cancer: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states, 1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
801	Bowling alleys, billiard and pool parlors	19	1.8	1.1	2.8
371	Scientific and controlling instruments	55	1.4	1.1	1.9
360	Ship and boat building and repairing	84	1.3	1.1	1.7
472	Not specified utilities	63	1.3	1.0	1.7
772	Beauty shops	211	1.3	1.1	1.5
130	Tobacco manufactures	95	1.3	1.1	1.6
271	Iron and steel foundries	90	1.3	1.1	1.6
041	Coal mining	327	1.3	1.1	1.4
802	Miscellaneous entertainment and recreation services	251	1.2	1.1	1.4
351	Motor vehicles and motor vehicle equipment	493	1.2	1.1	1.3
410	Trucking service	1,004	1.2	1.1	1.3
682	Miscellaneous retail stores	142	1.2	1.0	1.4
282	Fabricated structural metal products	124	1.2	1.0	1.4
172	Printing, publishing, and allied industries, except newspapers	271	1.2	1.1	1.4
060	Construction	3,336	1.2	1.2	1.2
641	Eating and drinking places	909	1.2	1.1	1.2
942	Military	680	1.1	1.1	1.2
751	Automotive repair and related services	452	1.1	1.0	1.3
400	Railroads	385	1.1	1.0	1.2
392	Not specified manufacturing industries	782	1.1	1.0	1.2

CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of lung cancer deaths in the selected states for this same time period was 37,562, and the comparable number of lung cancer deaths in the entire United States for this same time period was 162,546. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 13-2. Lung cancer: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states, 1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
205	Health record technologists and technicians	5	3.1	1.0	7.3
646	Lay-out workers	13	2.5	1.3	4.3
636	Precision assemblers, metal	14	2.4	1.3	4.0
459	Attendants, amusement and recreation facilities	48	1.7	1.3	2.3
614	Drillers, oil well	18	1.7	1.0	2.7
556	Supervisors: painters, paperhangers, and plasterers	30	1.5	1.0	2.2
029	Buyers, wholesale and retail trade except farm products	38	1.5	1.0	2.0
435	Waiters and waitresses	258	1.4	1.3	1.6
756	Mixing and blending machine operators	48	1.4	1.0	1.9
534	Heating, air conditioning, and refrigeration mechanics	57	1.4	1.1	1.8
469	Personal service occupations, n.e.c.	54	1.4	1.1	1.8
683	Electrical and electronic equipment assemblers	90	1.4	1.1	1.7
823	Railroad conductors and yardmasters	58	1.4	1.0	1.8
689	Inspectors, testers, and graders	54	1.4	1.0	1.8
518	Industrial machinery repairers	206	1.3	1.1	1.5
544	Millwrights	64	1.3	1.0	1.7
653	Sheet metal workers	83	1.3	1.0	1.6
616	Mining machine operators	317	1.3	1.1	1.4
579	Painters, construction and maintenance	227	1.3	1.1	1.4
503	Supervisors, mechanics and repairers	113	1.3	1.0	1.5
458	Hairdressers and cosmetologists	190	1.3	1.1	1.4
633	Supervisors, production occupations	632	1.2	1.1	1.3
585	Plumbers, pipefitters, and steamfitters	240	1.2	1.1	1.4
337	Bookkeepers, accounting, and auditing clerks	343	1.2	1.1	1.4
783	Welders and cutters	253	1.2	1.1	1.4
575	Electricians	307	1.2	1.1	1.4
844	Operating engineers	241	1.2	1.0	1.3
869	Construction laborers	557	1.2	1.1	1.3
804	Truck drivers	1,258	1.2	1.1	1.2
505	Automobile mechanics	365	1.2	1.0	1.3
567	Carpenters	588	1.2	1.1	1.2
905	Military occupations	591	1.1	1.1	1.2
785	Assemblers	345	1.1	1.0	1.2
453	Janitors and cleaners	757	1.1	1.0	1.2
019	Managers and administrators, n.e.c.	2,075	1.1	1.0	1.1

COC - Census Occupation Code n.e.c. - not elsewhere classified LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of lung cancer deaths in the selected states for this same time period was 37,562, and the comparable number of lung cancer deaths in the entire United States for this same time period was 162,546. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Section 14

Other Interstitial Pulmonary Diseases

Table 14-1. Other interstitial pulmonary diseases: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states, 1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
232	Wood buildings and mobile homes	5	4.8	1.5	11.1
040	Metal mining	15	2.2	1.2	3.6
891	Research, development and testing services	15	2.1	1.2	3.5
812	Offices and clinics of physicians	31	1.8	1.2	2.6
282	Fabricated structural metal products	19	1.8	1.1	2.8
460	Electric light and power	32	1.7	1.1	2.3
700	Banking	43	1.4	1.0	1.9
831	Hospitals	128	1.2	1.0	1.5

CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of other interstitial pulmonary diseases deaths in the selected states for this same time period was 4,471, and the comparable number of other interstitial pulmonary diseases deaths in the entire United States for this same time period was 18,655. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 14-2. Other interstitial pulmonary diseases: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states, 1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
086	Veterinarians	7	5.5	2.2	11.4
155	Teachers, prekindergarten and kindergarten	5	3.4	1.1	8.0
508	Aircraft engine mechanics	8	2.4	1.0	4.6
544	Millwrights	11	2.1	1.0	3.7
319	Receptionists	14	2.1	1.1	3.4
084	Physicians	23	2.0	1.3	3.0
095	Registered nurses	74	1.6	1.2	2.0

COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit
NOTE: The comparable total number of other interstitial pulmonary diseases deaths in the selected states for this same time period was 4,471, and the comparable number of other interstitial pulmonary diseases deaths in the entire United States for this same time period was 18,655. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.
SOURCE: National Center for Health Statistics multiple cause-of-death data.

Section 15

Pneumonia and Influenza

Table 15-1. Pneumonia and/or influenza: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual industry, U.S. residents age 15 and over, selected states, 1999

CIC	Industry	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
861	Job training and vocational rehabilitation services	20	1.6	1.0	2.5
041	Coal mining	410	1.3	1.2	1.5
990	Industry not reported	2,487	1.1	1.0	1.1
961	Non-paid worker or non-worker or own home/at home	13,459	1.1	1.0	1.1

CIC - Census Industry Code LCL - lower confidence limit UCL - upper confidence limit

NOTE: The comparable total number of pneumonia and/or influenza deaths in the selected states for this same time period was 52,295, and the comparable number of pneumonia and/or influenza deaths in the entire United States for this same time period was 229,136. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.

SOURCE: National Center for Health Statistics multiple cause-of-death data.

Table 15-2. Pneumonia and/or influenza: Proportionate mortality ratio (PMR) adjusted for age, sex, and race by usual occupation, U.S. residents age 15 and over, selected states, 1999

COC	Occupation	Number of Deaths	PMR	95% Confidence Interval	
				LCL	UCL
848	Hoist and winch operators	8	2.5	1.1	4.8
917	Unemployed, never worked, disabled	911	1.9	1.8	2.0
466	Baggage porters and bellhops	20	1.8	1.1	2.8
008	Personnel and labor relations managers	54	1.5	1.2	2.0
875	Garbage collectors	38	1.4	1.0	2.0
616	Mining machine operators	396	1.3	1.2	1.5
338	Payroll and timekeeping clerks	56	1.3	1.0	1.7
999	Occupation not reported	2,572	1.1	1.0	1.1
889	Laborers, except construction	1,259	1.1	1.0	1.1
914	Housewife/Homemaker	12,475	1.0	1.0	1.0

COC - Census Occupation Code LCL - lower confidence limit UCL - upper confidence limit

NOTE: The comparable total number of pneumonia and/or influenza deaths in the selected states for this same time period was 52,295, and the comparable number of pneumonia and/or influenza deaths in the entire United States for this same time period was 229,136. See selected limitations for general cautions regarding inferences based on small numbers of deaths, and see appendices for source description, methods, ICD codes, industry and occupation codes, and list of selected states.

SOURCE: National Center for Health Statistics multiple cause-of-death data.

Section 16

Various Work-Related Respiratory Conditions

Table 16-1. Respiratory illnesses with days away from work: Estimated number of cases (reported by employers), U.S. private sector, 1996–2004

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Acute respiratory infections (including common cold)	**212**	**267**	**193**	**149**	**307**	**175**	**149**	**300**	**90**
Other diseases of upper respiratory tract	**169**	**155**	**193**	**320**	**117**	**215**	**179**	**110**	**50**
Allergic rhinitis	51	71	-	121	-	88	-	40	-
Chronic conditions of upper respiratory tract (including chronic sinusitis, pharyngitis)	41	-	-	-	-	-	-	-	-
Other diseases of upper respiratory tract, unspecified or n.e.c.	42	-	-	167	-	84	-	40	20
Pneumonia, influenza	**79**	**115**	**144**	**197**	**95**	**310**	**176**	**200**	**-**
Influenza	-	-	-	63	-	236	-	60	-
Pneumonia	46	-	72	99	46	73	108	-	-
Legionnaires' disease	17	-	-	-	-	-	-	-	-
Chronic obstructive pulmonary disease (COPD) and allied conditions	**2,160**	**1,005**	**1,097**	**760**	**1,083**	**768**	**792**	**720**	**670**
Bronchitis	738	127	-	171	205	120	50	100	100
Extrinsic asthma	403	606	154	282	618	413	317	370	450
COPD and allied conditions, unspecified or n.e.c.	926	173	237	133	171	64	89	160	-
Extrinsic alveolitis and pneumonitis (including farmers' lung, bagassosis)	87	98	161	145	88	130	267	100	70
Pneumoconioses	**45**	**-**	**108**	**82**	**70**	**-**	**-**	**40**	**50**
Coal workers' pneumoconiosis (including anthracosis, black lung, miners' asthma)	-	-	73	-	-	-	-	20	-
Pneumoconioses, unspecified	18	-	-	-	19	-	-	-	40
Pneumonopathy	**39**	**-**	**-**	**19**	**101**	**-**	**-**	**-**	**-**
Byssinosis, mill fever	-	-	-	-	-	-	-	20	20
Metal fume fever	-	-	-	-	80	-	-	-	-
Pneumonopathy, unspecified	-	-	-	-	-	-	-	-	-
Other respiratory system diseases	**80**	**289**	**182**	**114**	**139**	**103**	**76**	**260**	**120**
Pneumonitis, n.e.c.	-	-	-	18	-	-	-	-	-
Atelectasis, collapsed lung	18	103	-	-	-	-	-	170	-
Other respiratory system diseases, unspecified or n.e.c.	47	163	76	83	101	2	-	70	20
Respiratory system diseases, unspecified	**882**	**357**	**544**	**517**	**679**	**284**	**477**	**310**	**440**
ALL RESPIRATORY SYSTEM DISEASES	**3,665**	**2,270**	**2,490**	**2,158**	**2,591**	**1,913**	**1,895**	**1,980**	**1,450**

- indicates no data reported or data that do not meet BLS publication guidelines. n.e.c. - not elsewhere classified
NOTE: Numbers may not sum to totals due to rounding. See appendices for source description and methods.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 16-2. Respiratory illnesses with days away from work: Median days away from work (based on cases reported by employers), U.S. private sector, 1996–2004

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Acute respiratory infections (including common cold)	**5**	**2**	**2**	**5**	**3**	**3**	**3**	**5**	**5**
Other diseases of upper respiratory tract	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**5**	**5**
Allergic rhinitis	3	-	-	1	-	3	1	3	-
Chronic conditions of upper respiratory tract (including chronic sinusitis, pharyngitis)	-	-	-	-	-	-	5	-	-
Other diseases of upper respiratory tract, unspecified or n.e.c.	4	3	3	2	-	2	33	20	2
Pneumonia, influenza	**10**	**9**	**4**	**9**	**23**	**5**	**7**	**2**	**-**
Influenza	-	-	-	2	-	3	-	4	-
Pneumonia	10	-	4	10	8	5	11	-	-
Legionnaires' disease	12	-	-	-	-	-	-	-	-
Chronic obstructive pulmonary disease (COPD) and allied conditions	**6**	**3**	**2**	**5**	**3**	**3**	**5**	**10**	**3**
Bronchitis	2	3	-	5	7	2	5	12	2
Extrinsic asthma	6	3	1	8	3	4	3	11	3
COPD and allied conditions, unspecified or n.e.c.	9	5	3	5	15	11	9	22	-
Extrinsic alveolitis and pneumonitis (including farmers' lung, bagassosis)	5	2	5	3	12	2	14	3	2
Pneumoconioses	**14**	**-**	**157**	**81**	**41**	**-**	**-**	**16**	**4**
Coal workers' pneumoconiosis (including anthracosis, black lung, miners' asthma)	-	-	190	-	-	-	-	180	-
Pneumoconioses, unspecified	14	-	-	-	8	-	-	-	4
Pneumonopathy	**15**	**-**	**-**	**3**	**3**	**-**	**-**	**-**	**-**
Byssinosis, mill fever	-	-	-	-	-	-	-	2	-
Metal fume fever	-	-	-	-	3	-	-	-	-
Pneumonopathy, unspecified	-	-	-	-	-	-	-	-	-
Other respiratory system diseases	**5**	**5**	**2**	**11**	**2**	**9**	**10**	**7**	**15**
Pneumonitis, n.e.c.	-	-	-	3	-	-	-	-	-
Atelectasis, collapsed lung	11	5	-	-	-	-	-	7	-
Other respiratory system diseases, unspecified or n.e.c.	2	-	5	24	2	-	-	38	3
Respiratory system diseases, unspecified	**2**	**6**	**2**	**1**	**1**	**3**	**5**	**2**	**6**
ALL RESPIRATORY SYSTEM DISEASES	**5**	**5**	**2**	**3**	**4**	**3**	**5**	**5**	**5**

- indicates no data reported or data that do not meet BLS publication guidelines. n.e.c. - not elsewhere classified.
NOTE: See appendices for source description and methods.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 16-3a. Estimated number of employees (in thousands) and number of respiratory illnesses reported by employers by major SIC industry division, 1996–2002

	Agriculture (SIC 01–09)		Mining (SIC 10–14)		Construction (SIC 15–17)		Manufacturing (SIC 20–39)		Transportation and Public Utilities (SIC 40–49)		Wholesale and Retail Trade (SIC 50–59)		Finance (SIC 60–67)		Services (SIC 70–89)	
Year	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**
1996	1,717	-	578	15	5,360	178	18,461	840	5,989	503	28,027	589	6,746	161	31,895	1,365
1997	1,765	-	596	33	5,637	177	18,657	671	6,171	163	28,584	490	6,952	42	33,305	667
1998	1,815	-	589	91	5,950	67	18,807	681	6,307	244	29,087	423	7,219	162	34,624	798
1999	1,861	-	535	38	6,337	59	18,538	682	6,578	236	29,716	381	7,400	84	36,374	665
2000	1,912	-	536	37	6,623	80	18,425	527	6,792	222	30,305	705	7,436	247	37,686	750
2001	1,171	-	535	24	6,774	99	16,386	364	4,738	95	20,910	351	7,679	67	50,858	892
2002	1,156	-	506	28	6,684	91	15,209	327	4,581	99	20,636	362	7,706	112	50,893	850

- indicates no data reported or data that do not meet BLS publication guidelines. SIC - Standard Industrial Classification Empl. - employment
NOTE: The sum of individual industries may not equal yearly total due to rounding. See appendices for source description and methods.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 16-3b. Estimated number of employees (in thousands) and number of respiratory illnesses reported by employers by major NAICS industry division, 2003–2004

	Natural Resources and Mining (NAICS 11, 21)		Construction (NAICS 23)		Manufacturing (NAICS 31–33)		Trade, Transportation, and Utilities (NAICS 22, 42, 44–45, 48–49)		Information (NAICS 51)		Financial Activities (NAICS 52)		Professional and Business Services (NAICS 60–67)		Education and Health Services (NAICS 70–89)		Leisure and Hospitality (NAICS 71)		Other Services (NAICS 81)	
Year	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**	**Empl.**	**No. of Cases**
2003	1,465	20	6,672	280	14,460	380	25,042	240	3,181	130	7,827	90	15,859	120	15,738	50	12,162	20	3,778	-
2004	1,482	30	6,916	-	14,257	250	25,273	160	3,100	150	7,891	50	16,295	150	16,085	470	12,468	140	3,785	-

- indicates no data reported or data that do not meet BLS publication guidelines. NAICS - North American Industry Classification System Empl. - employment
NOTE: The sum of individual industries may not equal yearly total due to rounding. See appendices for source description and methods.
SOURCE: Bureau of Labor Statistics annual reports of occupational injuries and illnesses.

Table 16-4 (page 1 of 2). Work-related respiratory conditions: Number of diagnoses associated with asbestos or other occupational exposures based on physician's judgment, selected occupational and environmental clinics, 1994–2004

	Number of diagnoses with asbestos exposure		Number of diagnoses with other occupational exposures		
	No.	%	No.	%	Most frequent hazards (No.)
RESPIRATORY DISEASES					
Malignant conditions	**33**	**0.7**	**10**	**0.5**	
Lung cancer	21	0.4	5	0.3	crystalline silica (2)
Laryngeal cancer	5	0.1	4	0.2	crystalline silica, dust n.o.s., exhaust n.o.s., hydrochloric acid, nitric acid, sulfuric acid (1 each)
Tonsillar cancer	-	-	1	0.1	smoke n.o.s. (1)
Mesothelioma	7	0.1	-	-	n/a
Upper airway diseases	**2**	**0.0**	**316**	**16.5**	
Upper respiratory irritation	1	0.0	304	15.8	indoor air pollutants (89), mold (33), dust n.o.s. (18)
Laryngeal disorders (excl. irritation or cancer)	1	0.0	8	0.4	indoor air pollutants (4), smoke n.o.s. (2)
Nasal polyps	-	-	2	0.1	asphalt, solvents n.o.s. (1 each)
Tracheal disorders (incl. tracheitis)	-	-	2	0.1	smoke n.o.s., soldering n.o.s. (1 each)
Lower airway diseases	**44**	**0.9**	**889**	**46.4**	
Asthma (incl. reactive airways dysfunction syndrome)	9	0.2	708	36.9	indoor air pollutants (138), isocyanates n.o.s. (49), solvents n.o.s. (42)
COPD (incl. emphysema & chronic bronchitis)	35	0.7	104	5.4	smoke n.o.s (16), coal (10), crystalline silica (10)
Bronchitis, acute	-	-	12	0.6	chemicals n.o.s., indoor air pollutants (2 each)
Bronchitis, n.o.s.	-	-	64	3.3	chemicals n.o.s. (8), indoor air pollutants (8), acrolein (6)
Bronchiectasis	-	-	1	0.1	indoor air pollutants (1)
Interstitial inflammatory/fibrotic diseases	**4,378**	**92.4**	**275**	**14.3**	
Asbestosis	4,373	92.3	1	0.1	diesel exhaust (1)
Silicosis	-	-	166	8.7	crystalline silica (162)
Coal workers' pneumoconiosis	-	-	62	3.2	coal (62), amorphous silica (1)
Pneumoconiosis due to other or mixed dust	3	0.1	10	0.5	cement dust, cotton dust, welding n.o.s. (2 each)
Hypersensitivity pneumonitis	-	-	14	0.7	cutting oils (4), mold (3), wood dust n.o.s. (2)
Interstitial pulmonary fibrosis	2	0.0	13	0.7	chemicals n.o.s., lubricants n.o.s., mold n.o.s. (2 each)
Chemical pneumonitis	-	-	4	0.2	smoke n.o.s. (2)
Pneumonia	-	-	3	0.2	dust n.o.s., fumes n.o.s., late effects of traumatic injury (1 each)
Sarcoidosis	-	-	2	0.1	crystalline silica, paint, smoke n.o.s. (1 each)
Non-malignant pleural disease (w/o apparent lung disease)	**260**	**5.5**	**5**	**0.3**	crystalline silica (2)
Non-specific respiratory disorders	**1**	**0.0**	**10**	**0.5**	epoxy resins, fungicide n.o.s., methyl methacrylate, paint thinner, plastic smoke, printing chemicals n.o.s., smoke n.o.s., solvents n.o.s., sulfites n.o.s., zinc chloride (1 each)

See footnotes at end of table.

Table 16-4 (page 2 of 2). Work-related respiratory conditions: Number of diagnoses associated with asbestos or other occupational exposures based on physician's judgment, selected occupational and environmental clinics, 1994–2004

	Number of diagnoses with asbestos exposure		Number of diagnoses with other occupational exposures		
	No.	%	No.	%	Most frequent hazards (No.)
OTHER CONDITIONS					
Symptoms	**8**	**0.2**	**45**	**2.3**	
Shortness of breath	6	0.1	17	0.9	indoor air pollutants (3), solvents n.o.s. (2)
Cough	2	0.0	18	0.9	indoor air pollutants (6)
Chest pain	-	-	7	0.4	indoor air pollutants (2)
Hoarseness	-	-	2	0.1	indoor air pollutants (2)
Nosebleeds	-	-	1	0.1	glutaraldehyde (1)
Chemical poisonings	**-**	**-**	**43**	**2.2**	
Toxic effects of carbon monoxide	-	-	13	0.7	carbon monoxide (12), treated human sludge waste (1)
Metal fume fever	-	-	8	0.4	metal fumes n.o.s., zinc (2 each)
Toxic effects of gas/fumes/vapors/misc. chemicals (excl. lead or other heavy metals, pesticides, solvents)	-	-	21	1.1	smoke n.o.s. (3), carbon monoxide (2), ethylene oxide (2)
Hypoxia	-	-	1	0.1	fumes n.o.s. (1)
Miscellaneous	**11**	**0.2**	**325**	**16.9**	
Multiple chemical sensitivity	-	-	141	7.4	indoor air pollutants (53), chemicals n.o.s. (14), hydrocarbons n.o.s. (14), solvents n.o.s. (14)
Sick building syndrome	-	-	132	6.9	indoor air pollutants (112), hydrocarbons n.o.s. (3)
Positive PPD skin test	-	-	41	2.1	tuberculosis (41)
Lung function abnormalities	3	0.1	11	0.6	solvents n.o.s. (4)
Chest x-ray abnormalities	8	0.2	-	-	n/a
TOTAL	**4,737**	**100.0**	**1,918**	**100.0**	

- indicates no cases n.o.s. - not otherwise specified n/a - not applicable

NOTE: In this table, some diagnoses particularly those in the chemical poisonings and miscellaneous categories may not have been respiratory. Some patients (< 1%) in the asbestos exposure group had environmental exposure only. See appendices for source description and methods.

SOURCE: Association of Occupational and Environmental Clinics (AOEC) Occupational and Environmental Disease Database.

Table 16-5. Work-related respiratory conditions: Most frequent associated hazards (excluding asbestos) based on physician's judgment, selected occupational and environmental clinics, 1994–2004

Respiratory Hazards	Number	Percent
Indoor air pollutants	431	19.8
Crystalline silica	186	8.5
Solvents n.o.s.	92	4.2
Smoke n.o.s.	83	3.8
Coal (incl. coal dust)	75	3.4
Dust n.o.s.	75	3.4
Chemicals n.o.s.	73	3.3
Mold	63	2.9
Isocyanates n.o.s.	58	2.7
Paint (incl. epoxy, latex, oil-based)	50	2.3
Cutting oils	44	2.0
Latex, natural rubber	41	1.9
Tuberculosis	41	1.9
Welding n.o.s. (incl. fumes)	40	1.8
Hydrocarbons n.o.s.	27	1.2
Formaldehyde	24	1.1
Cleaning materials n.o.s. (incl. disinfectants)	22	1.0
Glutaraldehyde	22	1.0
Wood dust n.o.s.	18	0.8
Diesel exhaust	17	0.8
Glues n.o.s.	17	0.8
Carbon monoxide	16	0.7
Lubricants n.o.s.	15	0.7
Metal fumes n.o.s.	15	0.7
Acids, bases, oxidizers n.o.s.	14	0.6
Epoxy resins	13	0.6
Photo developing chemicals n.o.s.	10	0.5
Toluene	10	0.5
Flour n.o.s.	9	0.4
Methyl ethyl ketone	9	0.4
Acrylates n.o.s.	8	0.4
Asphalt	8	0.4
Bleach	8	0.4
Freon®	8	0.4
Odors	8	0.4
Pesticides n.o.s.	8	0.4
Polymers n.o.s.	8	0.4
Sulfuric acid	8	0.4
Ammonia solution n.o.s.	7	0.3
Ethylene oxide	7	0.3
Hydrochloric acid	7	0.3
Plastic smoke	7	0.3
Acrolein	6	0.3
Cement dust	6	0.3
Hydrogen sulfide	6	0.3
Irritant gases n.o.s.	6	0.3
Man-made mineral fibers	6	0.3
Plant material n.o.s.	6	0.3
Polyvinyl chloride	6	0.3
All others	435	20.0
TOTAL	**2,179**	**100.0**

n.o.s. - not otherwise specified
NOTE: See appendices for source description and methods.
SOURCE: Association of Occupational and Environmental Clinics (AOEC) Occupational and Environmental Disease Database.

Section 17

Smoking Prevalence by Industry and Occupation

Table 17-1 (page 1 of 2). Smoking status: Estimated prevalence by current industry, U.S. residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Elementary and secondary schools and colleges	10,775,110	68.7	67.8 – 69.6	18.6	17.9 – 19.4	12.4	11.7 – 13.0
Private households	860,227	63.2	60.0 – 66.3	15.8	13.4 – 18.2	20.6	17.9 – 23.3
Hospitals	5,260,506	63.2	61.8 – 64.6	19.2	18.1 – 20.3	17.2	16.2 – 18.3
Banking and credit agencies	2,835,520	62.6	60.7 – 64.4	17.8	16.3 – 19.3	19.3	17.7 – 20.8
Other educational services	564,502	61.9	57.9 – 66.0	24.3	20.8 – 27.9	13.6	10.6 – 16.6
Social services, religious and membership organizations	4,795,978	61.1	59.7 – 62.5	20.8	19.6 – 22.0	17.9	16.8 – 19.0
Legal, engineering and other professional services	4,923,739	61.1	59.7 – 62.6	22.3	21.1 – 23.5	16.1	15.1 – 17.1
Health services, except hospitals	7,130,434	59.2	58.1 – 60.4	18.6	17.7 – 19.5	21.7	20.7 – 22.6
Entertainment and recreation services	2,337,336	58.9	56.8 – 61.0	18.7	17.1 – 20.4	22.2	20.4 – 23.9
General merchandise stores	2,289,128	58.5	56.3 – 60.6	16.5	14.9 – 18.2	24.7	22.8 – 26.5
Public administration	6,199,357	57.7	56.4 – 58.9	22.7	21.6 – 23.8	19.2	18.2 – 20.2
Armed forces (excludes Reserves and National Guard)	33,960	57.7	40.9 – 74.5	25.7	10.0 – 41.4	16.6	4.5 – 28.7
Communications	1,925,957	57.4	55.2 – 59.7	20.4	18.5 – 22.2	21.9	20.1 – 23.8
Agriculture	2,992,257	56.6	54.7 – 58.5	19.1	17.6 – 20.5	23.8	22.2 – 25.4
Insurance, real estate and other finance	5,600,118	56.6	55.3 – 58.0	22.3	21.2 – 23.4	20.6	19.6 – 21.7
Electrical machinery, equipment and supplies	1,620,253	56.5	54.0 – 59.0	19.3	17.2 – 21.3	24.0	21.9 – 26.2
Chemicals and allied products	1,205,561	56.5	53.5 – 59.5	22.1	19.6 – 24.6	20.9	18.5 – 23.4
Textile mill and finished textile products	1,189,333	56.2	53.3 – 59.1	15.9	13.8 – 18.0	27.4	24.7 – 30.1
Other and not specified retail trade	6,387,434	56.2	54.9 – 57.5	19.5	18.4 – 20.5	23.9	22.8 – 25.1
Business services	7,134,653	55.6	54.4 – 56.8	19.1	18.2 – 20.1	24.8	23.7 – 25.8
Food, bakery and dairy stores	2,849,542	53.7	51.7 – 55.7	15.7	14.3 – 17.0	30.2	28.4 – 32.1
Other and not specified durable goods	2,095,107	52.7	50.5 – 55.0	21.5	19.6 – 23.3	25.5	23.6 – 27.5
Other personal services	3,213,006	52.2	50.4 – 54.0	18.9	17.5 – 20.3	28.4	26.8 – 30.0
Other transportation	2,923,721	52.0	50.1 – 54.0	24.3	22.6 – 25.9	23.2	21.6 – 24.7
Utilities and sanitary	1,411,762	51.9	49.1 – 54.8	24.0	21.6 – 26.4	23.6	21.2 – 26.1
Food and kindred products	1,879,890	51.3	48.9 – 53.7	19.6	17.7 – 21.5	28.8	26.7 – 31.0

See footnotes at end of table.

Table 17-1 (page 2 of 2). Smoking status: Estimated prevalence by current industry, U.S. residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Wholesale trade	4,205,388	50.8	49.2 – 52.5	22.7	21.3 – 24.0	25.9	24.5 – 27.3
Printing publishing and allied industries	1,624,590	50.4	47.8 – 52.9	22.9	20.8 – 25.0	26.7	24.4 – 29.0
Forestry and fisheries	163,467	50.0	41.7 – 58.3	26.7	19.2 – 34.1	22.9	15.8 – 30.1
Machinery, except electrical	2,034,373	49.7	47.4 – 52.1	22.9	20.9 – 24.9	26.9	24.9 – 29.0
Eating and drinking places	5,859,920	49.2	47.8 – 50.6	11.9	11.0 – 12.7	38.4	37.0 – 39.7
Transportation equipment	2,267,223	48.9	46.7 – 51.1	24.6	22.7 – 26.5	26.4	24.5 – 28.3
Mining	492,923	48.4	43.5 – 53.4	18.2	14.7 – 21.8	33.2	28.7 – 37.6
Trucking service and warehousing	2,497,242	48.1	45.9 – 50.2	19.8	18.1 – 21.4	31.7	29.7 – 33.6
Furniture, lumber and wood	1,444,925	47.6	44.8 – 50.4	18.9	16.8 – 21.1	33.1	30.4 – 35.7
Other nondurable goods	1,532,316	46.2	43.5 – 48.9	24.0	21.7 – 26.3	29.6	27.1 – 32.0
Automotive dealers and gasoline stations	2,005,723	45.9	43.4 – 48.4	19.9	17.8 – 21.9	33.6	31.3 – 35.9
Construction	9,137,436	43.7	42.6 – 44.8	19.7	18.9 – 20.6	36.1	35.0 – 37.1
Primary metal industry	746,402	43.7	39.8 – 47.7	22.7	19.5 – 25.9	33.1	29.3 – 36.9
Railroads	283,429	43.6	37.4 – 49.8	27.0	21.1 – 32.8	28.1	22.4 – 33.9
Fabricated metal industries, including ordnance	1,087,197	42.2	39.1 – 45.3	23.6	20.9 – 26.4	34.1	31.1 – 37.1
Repair services	1,932,012	40.1	37.7 – 42.5	22.9	20.9 – 24.9	36.2	33.8 – 38.6
Refused, not ascertained, don't know	4,562,408	59.7	58.3 – 61.2	12.2	11.3 – 13.2	16.4	15.3 – 17.5
TOTAL	**132,311,362**	**55.5**	**55.2 – 55.7**	**19.6**	**19.4 – 19.9**	**24.1**	**23.9 – 24.3**

NOTE: See appendices for source description and methods.
SOURCE: National Center for Health Statistics Health Interview Survey.

Table 17-2 (page 1 of 2). Smoking status: Estimated prevalence by current industry, U.S. male residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Elementary and secondary schools and colleges	3,408,822	65.3	63.6 – 67.0	20.9	19.5 – 22.4	13.4	12.2 – 14.6
Health services, except hospitals	1,453,541	61.7	59.1 – 64.4	22.1	19.8 – 24.4	15.9	13.9 – 17.8
Hospitals	1,241,064	60.6	57.6 – 63.6	22.5	19.9 – 25.0	16.5	14.3 – 18.7
Legal, engineering and other professional services	2,634,476	60.5	58.5 – 62.5	24.4	22.6 – 26.1	14.7	13.3 – 16.1
Entertainment and recreation services	1,355,116	58.7	55.9 – 61.6	18.6	16.4 – 20.8	22.6	20.2 – 24.9
Banking and credit agencies	913,167	58.3	54.8 – 61.8	21.3	18.4 – 24.2	20.0	17.1 – 22.9
Armed forces (excludes Reserves and National Guard)	24,397	57.5	36.6 – 78.3	29.3	9.1 – 49.6	13.2	0.3 – 26.1
Electrical machinery, equipment and supplies	1,036,872	56.6	53.3 – 59.9	20.5	17.8 – 23.2	22.7	20.0 – 25.5
Social services, religious and membership organizations	1,279,205	56.3	53.4 – 59.3	26.6	24.0 – 29.2	16.7	14.4 – 18.9
Public administration	3,403,896	56.2	54.5 – 58.0	25.8	24.2 – 27.3	17.5	16.1 – 18.8
Communications	1,135,867	55.5	52.4 – 58.5	22.1	19.6 – 24.6	22.2	19.7 – 24.7
Agriculture	2,305,795	55.0	52.9 – 57.2	20.0	18.3 – 21.7	24.3	22.5 – 26.2
Insurance, real estate and other finance	2,633,959	55.0	53.0 – 57.1	25.6	23.8 – 27.3	19.0	17.5 – 20.6
Chemicals and allied products	803,248	54.6	50.8 – 58.3	24.3	21.0 – 27.5	20.7	17.7 – 23.7
Food, bakery and dairy stores	1,335,039	54.5	51.5 – 57.5	17.8	15.6 – 20.0	27.1	24.4 – 29.8
Business services	4,084,511	54.5	52.8 – 56.1	20.4	19.1 – 21.8	24.5	23.1 – 26.0
General merchandise stores	818,985	53.9	50.0 – 57.7	21.0	17.7 – 24.2	24.9	21.6 – 28.1
Other and not specified retail trade	3,063,880	53.1	51.1 – 55.1	21.1	19.5 – 22.7	25.3	23.6 – 27.1
Utilities and sanitary	1,140,025	51.0	47.8 – 54.3	24.8	22.0 – 27.5	23.8	21.0 – 26.6
Other educational services	182,072	50.1	42.5 – 57.7	32.3	25.1 – 39.5	17.6	11.5 – 23.6
Eating and drinking places	2,715,174	49.8	47.7 – 51.9	12.3	11.0 – 13.6	37.2	35.2 – 39.2
Other and not specified durable goods	1,396,893	49.7	46.9 – 52.5	23.2	20.8 – 25.6	26.8	24.3 – 29.3
Other transportation	1,856,690	48.4	45.9 – 50.9	27.1	24.8 – 29.3	24.1	22.0 – 26.2
Textile mill and finished textile products	552,242	48.0	43.5 – 52.6	21.8	18.1 – 25.5	29.3	25.1 – 33.4
Wholesale trade	3,000,102	47.9	45.9 – 49.9	24.6	22.9 – 26.3	26.8	25.1 – 28.5
Transportation equipment	1,716,134	47.9	45.3 – 50.5	26.2	23.9 – 28.6	25.7	23.5 – 28.0

See footnotes at end of table.

Table 17-2 (page 2 of 2). Smoking status: Estimated prevalence by current industry, U.S. male residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Machinery, except electrical	1,572,963	47.6	45.0 – 50.3	24.2	21.9 – 26.5	27.8	25.4 – 30.2
Food and kindred products	1,286,961	47.3	44.3 – 50.2	22.2	19.7 – 24.7	30.1	27.4 – 32.8
Mining	434,376	47.0	41.6 – 52.4	18.6	14.8 – 22.5	34.1	29.2 – 39.0
Forestry and fisheries	127,964	47.0	37.5 – 56.5	27.0	18.4 – 35.6	25.6	17.0 – 34.1
Trucking service and warehousing	2,041,530	46.9	44.5 – 49.2	20.9	19.0 – 22.8	31.7	29.6 – 33.9
Printing publishing and allied industries	944,693	46.2	42.8 – 49.7	24.0	21.1 – 27.0	29.7	26.5 – 33.0
Automotive dealers and gasoline stations	1,483,377	46.1	43.1 – 49.1	21.8	19.3 – 24.3	31.5	28.8 – 34.2
Private households	62,342	45.5	33.2 – 57.8	14.3	6.3 – 22.2	40.3	27.7 – 52.9
Other personal services	1,162,388	44.8	41.7 – 47.8	23.1	20.5 – 25.7	31.6	28.8 – 34.4
Furniture, lumber and wood	1,095,157	44.6	41.4 – 47.9	20.7	18.0 – 23.3	34.1	31.0 – 37.2
Other nondurable goods	1,116,743	44.3	41.0 – 47.5	26.9	24.0 – 29.8	28.7	25.7 – 31.6
Primary metal industry	641,803	43.6	39.3 – 48.0	22.7	19.2 – 26.3	33.1	29.0 – 37.3
Construction	8,288,151	42.9	41.8 – 44.1	19.9	19.0 – 20.8	36.7	35.6 – 37.8
Railroads	262,163	42.5	36.0 – 49.0	27.7	21.6 – 33.9	28.6	22.5 – 34.7
Fabricated metal industries, including ordnance	855,347	41.0	37.4 – 44.5	24.3	21.2 – 27.4	34.7	31.3 – 38.1
Repair services	1,726,775	38.5	36.0 – 41.0	23.8	21.7 – 26.0	36.8	34.3 – 39.4
Refused, not ascertained, don't know	2,517,978	55.2	53.2 – 57.2	14.0	12.6 – 15.4	17.8	16.3 – 19.3
TOTAL	**71,111,881**	**51.4**	**51.0 – 51.8**	**21.8**	**21.5 – 22.2**	**25.8**	**25.5 – 26.2**

NOTE: See appendices for source description and methods.
SOURCE: National Center for Health Statistics Health Interview Survey.

Table 17-3 (page 1 of 2). Smoking status: Estimated prevalence by current industry, U.S. female residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Elementary and secondary schools and colleges	7,366,288	70.3	69.2 – 71.3	17.6	16.7 – 18.4	11.9	11.1 – 12.6
Other educational services	382,430	67.5	63.0 – 72.1	20.5	16.7 – 24.4	11.7	8.4 – 15.0
Private households	797,885	64.6	61.3 – 67.8	15.9	13.5 – 18.4	19.1	16.4 – 21.7
Banking and credit agencies	1,922,353	64.6	62.4 – 66.8	16.2	14.5 – 17.9	18.9	17.2 – 20.7
Hospitals	4,019,442	64.0	62.5 – 65.5	18.2	17.0 – 19.4	17.4	16.2 – 18.6
Textile mill and finished textile products	637,092	63.3	59.6 – 67.0	10.7	8.5 – 13.0	25.8	22.3 – 29.3
Social services, religious and membership organizations	3,516,773	62.8	61.2 – 64.4	18.7	17.4 – 20.0	18.3	17.0 – 19.5
Agriculture	686,462	61.9	58.1 – 65.6	15.9	13.0 – 18.7	22.0	18.8 – 25.3
Legal, engineering and other professional services	2,289,263	61.9	59.9 – 63.9	19.9	18.2 – 21.6	17.7	16.2 – 19.2
General merchandise stores	1,470,142	61.0	58.4 – 63.6	14.1	12.2 – 15.9	24.6	22.3 – 26.8
Forestry and fisheries	35,503	60.9	44.7 – 77.1	25.6	10.8 – 40.3	13.5	2.3 – 24.7
Chemicals and allied products	402,313	60.4	55.6 – 65.1	17.8	14.2 – 21.5	21.5	17.4 – 25.6
Communications	790,090	60.2	56.9 – 63.6	17.9	15.3 – 20.5	21.5	18.7 – 24.3
Food and kindred products	592,929	60.1	56.3 – 63.9	13.9	11.2 – 16.5	26.0	22.5 – 29.4
Public administration	2,795,461	59.4	57.6 – 61.2	19.0	17.6 – 20.4	21.2	19.7 – 22.7
Other and not specified retail trade	3,323,553	59.1	57.3 – 60.8	17.9	16.6 – 19.3	22.7	21.2 – 24.1
Entertainment and recreation services	982,220	59.1	56.0 – 62.3	18.9	16.5 – 21.4	21.6	19.0 – 24.2
Mining	58,548	58.8	46.7 – 70.9	15.4	6.3 – 24.4	25.8	15.2 – 36.5
Other and not specified durable goods	698,214	58.8	55.2 – 62.3	18.1	15.3 – 20.8	23.0	20.0 – 26.0
Health services, except hospitals	5,676,893	58.6	57.3 – 59.9	17.7	16.7 – 18.7	23.1	22.0 – 24.3
Other transportation	1,067,031	58.4	55.4 – 61.3	19.3	17.0 – 21.7	21.5	19.1 – 23.9
Wholesale trade	1,205,286	58.2	55.4 – 60.9	18.0	15.8 – 20.1	23.6	21.3 – 25.9
Armed forces (excludes Reserves and National Guard)	9,563	58.1	31.0 – 85.2	16.6	0.0 – 34.4	25.3	0.0 – 51.3
Insurance, real estate and other finance	2,966,159	58.1	56.3 – 59.9	19.4	18.0 – 20.8	22.1	20.6 – 23.6
Business services	3,050,143	57.1	55.4 – 58.9	17.4	16.1 – 18.8	25.1	23.6 – 26.7
Railroads	21,267	57.0	37.9 – 76.0	17.5	2.6 – 32.5	22.2	8.0 – 36.5

See footnotes at end of table.

Table 17-3 (page 2 of 2). Smoking status: Estimated prevalence by current industry, U.S. female residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Machinery, except electrical	461,410	56.9	52.5 – 61.4	18.5	15.0 – 22.1	24.0	20.2 – 27.9
Furniture, lumber and wood	349,768	56.7	51.3 – 62.1	13.6	9.9 – 17.2	29.8	24.8 – 34.7
Other personal services	2,050,618	56.4	54.3 – 58.6	16.5	14.9 – 18.1	26.6	24.7 – 28.5
Electrical machinery, equipment and supplies	583,382	56.3	52.3 – 60.2	17.2	14.2 – 20.2	26.4	22.8 – 29.9
Printing publishing and allied industries	679,897	56.1	52.4 – 59.8	21.3	18.3 – 24.2	22.5	19.5 – 25.6
Utilities and sanitary	271,738	55.6	49.8 – 61.4	20.7	16.0 – 25.4	22.9	18.2 – 27.6
Repair services	205,237	53.5	46.6 – 60.4	14.9	10.0 – 19.9	30.8	24.4 – 37.2
Trucking service and warehousing	455,711	53.4	48.6 – 58.1	14.7	11.5 – 17.9	31.4	27.0 – 35.8
Food, bakery and dairy stores	1,514,503	53.0	50.3 – 55.6	13.7	12.0 – 15.5	33.0	30.6 – 35.5
Transportation equipment	551,089	52.0	47.9 – 56.1	19.4	16.2 – 22.6	28.5	24.9 – 32.2
Other nondurable goods	415,574	51.4	46.6 – 56.1	16.2	12.6 – 19.7	31.9	27.4 – 36.5
Construction	849,285	50.9	47.3 – 54.4	18.2	15.5 – 20.9	30.0	26.8 – 33.2
Eating and drinking places	3,144,746	48.7	46.9 – 50.6	11.5	10.4 – 12.7	39.4	37.6 – 41.2
Fabricated metal industries, including ordnance	231,849	47.0	40.5 – 53.5	21.1	15.7 – 26.6	31.9	25.8 – 37.9
Automotive dealers and gasoline stations	522,345	45.5	41.1 – 49.9	14.4	11.2 – 17.6	39.6	35.2 – 43.9
Primary metal industry	104,600	44.4	35.0 – 53.8	22.6	14.6 – 30.5	33.1	24.1 – 42.1
Refused, not ascertained, don't know	2,044,430	65.3	63.3 – 67.4	10.0	8.8 – 11.3	14.6	13.1 – 16.1
TOTAL	**61,199,481**	**60.2**	**59.8 – 60.6**	**17.1**	**16.8 – 17.4**	**22.1**	**21.7 – 22.4**

NOTE: See appendices for source description and methods.
SOURCE: National Center for Health Statistics Health Interview Survey.

Table 17-4 (page 1 of 2). Smoking status: Estimated prevalence by current occupation, U.S. residents age 18 and over, 1997–2004

Occupation	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Health diagnosing	1,060,786	74.6	71.9 – 77.4	19.9	17.4 – 22.4	5.1	3.8 – 6.5
Teachers, librarians, and counselors	6,949,300	71.2	70.1 – 72.3	18.2	17.3 – 19.2	10.3	9.6 – 11.0
Engineers	1,990,104	66.3	64.1 – 68.5	21.0	19.1 – 23.0	12.5	11.0 – 14.0
Natural mathematical and computer scientists	2,649,991	65.1	63.2 – 67.0	21.1	19.5 – 22.8	13.4	12.1 – 14.7
Private household	691,069	64.8	61.2 – 68.4	16.0	13.3 – 18.7	18.9	15.9 – 21.9
Health assessment and treating occupations	3,353,106	64.4	62.7 – 66.1	21.3	19.9 – 22.8	13.7	12.5 – 14.9
Other professional specialty	2,952,973	62.3	60.5 – 64.1	25.3	23.7 – 26.9	12.0	10.8 – 13.1
Computer equipment operators	378,791	61.5	56.3 – 66.6	18.2	14.0 – 22.4	19.1	15.3 – 23.0
Secretaries, stenographers, and typists	2,684,933	61.3	59.5 – 63.2	19.0	17.5 – 20.6	19.4	17.9 – 20.9
Farm operators and managers	893,227	60.9	57.5 – 64.2	23.5	20.6 – 26.3	15.3	12.9 – 17.7
Police and firefighters	1,452,583	60.8	58.1 – 63.5	20.4	18.2 – 22.6	18.2	16.1 – 20.3
Architects and surveyors	230,282	60.5	54.0 – 67.1	25.9	20.0 – 31.8	13.2	8.9 – 17.4
Personal service	2,765,854	60.4	58.6 – 62.3	18.3	16.8 – 19.7	20.8	19.2 – 22.3
Management related	5,123,439	60.2	58.8 – 61.6	21.3	20.1 – 22.5	18.4	17.3 – 19.5
Health technologist and technicians	1,866,864	59.9	57.6 – 62.3	17.8	15.9 – 19.6	22.0	20.1 – 24.0
Other administrative support	11,363,017	59.4	58.5 – 60.4	17.5	16.8 – 18.3	22.6	21.8 – 23.4
Writers, artists, entertainers, and athletes	2,321,769	59.3	57.2 – 61.3	22.9	21.1 – 24.6	17.7	16.1 – 19.2
Technologists and technicians except health	2,658,737	59.0	57.1 – 61.0	20.7	19.1 – 22.3	20.0	18.4 – 21.5
Financial records processing	2,115,805	57.9	55.8 – 60.1	19.3	17.6 – 21.0	22.3	20.5 – 24.0
Other sales	6,178,105	56.7	55.3 – 58.0	16.1	15.2 – 17.1	26.7	25.5 – 27.9
Health service	2,653,011	55.7	53.8 – 57.6	14.7	13.3 – 16.0	29.1	27.3 – 30.8
Officials and administrators, public administration	778,000	55.5	51.9 – 59.1	29.3	25.9 – 32.6	15.0	12.6 – 17.4
Sales representatives, commodities and finance	4,238,483	55.0	53.5 – 56.6	24.5	23.1 – 25.8	20.1	18.9 – 21.3
Freight, stock and material handlers	3,848,042	54.0	52.2 – 55.7	13.4	12.1 – 14.6	32.1	30.5 – 33.8
Managers and administrators, except public administration	12,517,663	53.9	52.9 – 54.8	23.9	23.1 – 24.7	21.9	21.1 – 22.6
Farm workers and other agricultural workers	1,994,542	53.2	51.0 – 55.5	16.6	14.9 – 18.3	29.4	27.3 – 31.5

See footnotes at end of table.

Table 17-4 (page 2 of 2). Smoking status: Estimated prevalence by current occupation, U.S. residents age 18 and over, 1997–2004

Industry	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Cleaning and building service	3,101,428	52.5	50.7 – 54.4	17.4	16.0 – 18.8	29.5	27.9 – 31.1
Supervisors and proprietors	3,864,657	51.7	50.0 – 53.4	22.4	21.0 – 23.8	25.4	24.0 – 26.9
Mail and message distributing	890,721	51.7	48.2 – 55.2	24.7	21.7 – 27.8	23.4	20.5 – 26.2
Other protective service	968,782	49.8	46.5 – 53.2	21.1	18.4 – 23.7	28.6	25.7 – 31.6
Fabricators, assemblers, inspectors and samplers	2,654,166	49.5	47.5 – 51.5	18.3	16.7 – 19.9	32.0	30.1 – 33.9
Food service	5,386,163	49.0	47.6 – 50.4	12.3	11.4 – 13.2	38.4	37.0 – 39.8
Machine operators and tenderers, except precision	4,400,009	48.1	46.6 – 49.7	17.8	16.6 – 19.0	33.8	32.3 – 35.3
Construction laborers	1,065,269	46.1	42.9 – 49.3	16.0	13.7 – 18.3	36.8	33.8 – 39.9
Military	22,962	46.1	25.1 – 67.0	31.3	10.7 – 52.0	22.6	5.5 – 39.7
Precision production	3,405,364	44.5	42.7 – 46.3	23.8	22.2 – 25.3	31.3	29.6 – 33.0
Other transportation, except motor vehicles	192,922	44.4	36.2 – 52.5	27.1	19.4 – 34.8	28.5	21.2 – 35.8
Motor vehicle operators	4,031,519	42.6	41.0 – 44.2	22.9	21.5 – 24.2	33.9	32.4 – 35.5
Mechanics and repairers	4,692,046	42.4	40.8 – 43.9	25.3	23.9 – 26.7	31.9	30.4 – 33.4
Material moving equipment operators	1,181,359	42.1	39.1 – 45.2	21.9	19.3 – 24.4	35.1	32.2 – 38.1
Construction and extractive trades	5,829,786	42.0	40.6 – 43.3	18.9	17.8 – 20.0	38.6	37.3 – 40.0
Forestry and fishing	158,696	39.4	31.0 – 47.8	21.0	14.1 – 27.9	38.8	30.4 – 47.1
Refused, not ascertained, don't know	4,755,041	59.5	58.1 – 60.9	12.7	11.7 – 13.6	16.5	15.4 – 17.6
TOTAL	**132,311,362**	**55.5**	**55.2 – 55.7**	**19.6**	**19.4 – 19.9**	**24.1**	**23.9 – 24.3**

NOTE: See appendices for source description and methods.
SOURCE: National Center for Health Statistics Health Interview Survey.

Table 17-5 (page 1 of 2). Smoking status: Estimated prevalence by current occupation, U.S. male residents age 18 and over, 1997–2004

Occupation	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Health diagnosing	763,693	73.2	69.9 – 76.5	22.1	19.0 – 25.3	4.2	2.8 – 5.7
Teachers, librarians, and counselors	2,177,803	67.9	65.8 – 70.0	20.9	19.1 – 22.7	11.0	9.6 – 12.4
Engineers	1,786,291	65.4	63.0 – 67.8	21.9	19.8 – 24.0	12.6	11.0 – 14.2
Natural mathematical and computer scientists	1,847,198	63.4	61.0 – 65.8	22.4	20.3 – 24.5	13.8	12.2 – 15.5
Other professional specialty	1,500,087	62.0	59.4 – 64.6	27.7	25.3 – 30.2	9.8	8.3 – 11.4
Health technologist and technicians	373,730	61.4	55.7 – 67.0	17.3	12.8 – 21.8	21.2	16.6 – 25.7
Health assessment and treating occupations	433,914	61.3	56.5 – 66.1	24.3	20.0 – 28.6	14.1	10.9 – 17.2
Police and firefighters	1,231,087	60.9	58.0 – 63.9	21.5	19.0 – 24.0	17.0	14.7 – 19.2
Secretaries, stenographers, and typists	60,762	60.6	47.5 – 73.7	20.8	10.1 – 31.4	18.6	7.9 – 29.4
Computer equipment operators	173,689	60.5	52.3 – 68.7	20.0	13.0 – 26.9	16.9	11.5 – 22.4
Farm operators and managers	738,134	60.1	56.4 – 63.8	24.8	21.6 – 28.0	14.7	12.0 – 17.3
Financial records processing	213,438	59.5	52.5 – 66.5	17.0	11.9 – 22.1	22.2	16.4 – 28.0
Management related	2,156,992	59.2	56.9 – 61.4	24.1	22.1 – 26.0	16.7	15.0 – 18.3
Technologist and technicians except health	1,809,092	57.9	55.5 – 60.4	22.6	20.5 – 24.7	19.1	17.2 – 21.0
Writers, artists, entertainers, and athletes	1,192,122	57.3	54.4 – 60.2	22.6	20.1 – 25.1	19.9	17.6 – 22.2
Architects and surveyors	189,636	56.0	48.6 – 63.4	29.4	22.5 – 36.2	14.1	9.3 – 19.0
Other administrative support	2,996,623	54.9	53.0 – 56.9	20.1	18.6 – 21.7	24.7	23.0 – 26.3
Sales representatives, commodities and finance	2,656,538	54.2	52.2 – 56.3	26.9	25.1 – 28.7	18.5	17.0 – 20.1
Personal service	487,213	53.9	49.1 – 58.6	22.0	18.2 – 25.8	23.3	19.1 – 27.4
Other sales	2,359,261	53.6	51.3 – 55.9	19.4	17.7 – 21.1	26.1	24.1 – 28.1
Freight, stock and material handlers	2,931,348	52.9	50.8 – 55.0	14.5	13.0 – 16.0	32.1	30.1 – 34.0
Managers and administrators, except public administraion	7,389,366	52.4	51.2 – 53.7	25.9	24.9 – 27.0	21.2	20.2 – 22.2
Officials and administrators, public administration	406,991	51.9	46.6 – 57.3	33.9	28.8 – 39.1	13.7	10.2 – 17.1
Farm workers and other agricultural workers	1,625,054	51.6	49.1 – 54.2	17.3	15.4 – 19.2	30.2	27.9 – 32.5
Mail and message distributing	515,279	51.4	46.7 – 56.2	26.5	22.2 – 30.7	22.0	18.3 – 25.7
Supervisors and proprietors	2,320,253	51.1	48.9 – 53.4	24.2	22.3 – 26.1	24.1	22.2 – 26.0

See footnotes at end of table.

Table 17-5 (page 2 of 2). Smoking status: Estimated prevalence by current occupation, U.S. male residents age 18 and over, 1997–2004

Occupation	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Health service	286,971	49.8	43.6 – 55.9	16.1	11.8 – 20.3	33.8	28.0 – 39.6
Food service	2,202,137	48.9	46.5 – 51.2	11.8	10.3 – 13.2	38.8	36.5 – 41.2
Other protective service	702,846	47.6	43.7 – 51.5	24.1	20.8 – 27.4	27.9	24.4 – 31.3
Private household	35,450	46.9	29.1 – 64.7	17.7	4.7 – 30.6	35.4	17.4 – 53.3
Military	16,561	46.7	20.8 – 72.6	33.9	7.6 – 60.1	19.4	0.7 – 38.1
Construction laborers	1,038,707	46.3	43.0 – 49.6	16.2	13.8 – 18.5	36.5	33.3 – 39.6
Cleaning and building service	1,667,648	46.2	43.6 – 48.8	22.3	20.2 – 24.5	30.8	28.5 – 33.2
Other transportation, except motor vehicles	188,622	44.6	36.3 – 52.9	27.4	19.5 – 35.3	28.0	20.7 – 35.4
Fabricators, assemblers, inspectors and samplers	1,653,379	43.9	41.2 – 46.5	21.0	18.8 – 23.2	34.8	32.3 – 37.3
Machine operators and tenderers, except precision	2,914,187	43.3	41.3 – 45.2	20.1	18.5 – 21.7	36.2	34.3 – 38.2
Material moving equipment operators	1,104,408	42.4	39.2 – 45.6	22.2	19.5 – 24.9	34.7	31.6 – 37.7
Construction and extractive trades	5,674,943	42.1	40.7 – 43.5	19.0	17.9 – 20.1	38.4	37.0 – 39.8
Mechanics and repairers	4,485,332	42.1	40.5 – 43.7	25.5	24.1 – 26.9	31.9	30.4 – 33.4
Precision production	2,591,182	41.9	39.9 – 44.0	25.8	24.0 – 27.7	31.8	29.8 – 33.8
Motor vehicle operators	3,518,996	41.4	39.6 – 43.1	23.8	22.3 – 25.3	34.3	32.6 – 36.0
Forestry and fishing	153,358	39.1	30.5 – 47.7	20.5	13.5 – 27.6	39.6	31.0 – 48.2
Refused, not ascertained, don't know	2,541,564	55.0	53.0 – 57.1	14.3	12.9 – 15.7	17.7	16.2 – 19.3
TOTAL	**71,111,881**	**51.4**	**51.0 – 51.8**	**21.8**	**21.5 – 22.2**	**25.8**	**25.5 – 26.2**

NOTE: See appendices for source description and methods.
SOURCE: National Center for Health Statistics Health Interview Survey.

Table 17-6 (page 1 of 2). Smoking status: Estimated prevalence by current occupation, U.S. female residents age 18 and over, 1997–2004

Occupation	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Architects and surveyors	40,646	81.5	70.8 – 92.2	9.8	2.2 – 17.4	8.7	0.6 – 16.9
Health diagnosing	297,093	78.3	73.5 – 83.0	14.2	10.3 – 18.2	7.5	4.3 – 10.8
Engineers	203,813	74.1	68.4 – 79.8	13.6	9.1 – 18.1	11.8	7.6 – 16.0
Teachers, librarians, and counselors	4,771,497	72.7	71.5 – 74.0	17.0	15.9 – 18.1	10.0	9.1 – 10.8
Natural mathematical and computer scientists	802,793	69.2	66.1 – 72.3	18.2	15.6 – 20.8	12.3	10.2 – 14.5
Private household	655,619	65.8	62.1 – 69.4	15.9	13.1 – 18.7	18.0	15.0 – 21.0
Health assessment and treating occupations	2,919,192	64.9	63.1 – 66.7	20.9	19.3 – 22.4	13.7	12.4 – 15.0
Farm operators and managers	155,093	64.5	57.1 – 71.9	17.2	11.3 – 23.1	18.3	12.4 – 24.3
Other professional specialty	1,452,885	62.6	60.2 – 65.0	22.8	20.6 – 24.9	14.2	12.5 – 15.9
Computer equipment operators	205,102	62.3	55.8 – 68.8	16.7	11.9 – 21.6	21.0	15.6 – 26.4
Personal service	2,278,641	61.8	59.9 – 63.8	17.5	15.9 – 19.0	20.2	18.6 – 21.9
Secretaries, stenographers, and typists	2,624,172	61.4	59.5 – 63.3	19.0	17.4 – 20.6	19.4	17.9 – 20.9
Technologists and technicians except health	849,645	61.3	58.1 – 64.6	16.7	14.2 – 19.2	21.8	19.0 – 24.5
Writers, artists, entertainers, and athletes	1,129,647	61.3	58.5 – 64.2	23.1	20.7 – 25.6	15.3	13.2 – 17.3
Other administrative support	8,366,394	61.1	60.0 – 62.1	16.6	15.8 – 17.4	21.9	21.0 – 22.8
Management related	2,966,447	60.9	59.2 – 62.6	19.3	17.8 – 20.7	19.7	18.3 – 21.1
Farm workers and other agricultural workers	369,488	60.3	55.2 – 65.4	13.4	9.8 – 17.1	25.8	21.2 – 30.4
Cleaning and building service	1,433,779	59.9	57.4 – 62.4	11.6	10.0 – 13.3	28.0	25.7 – 30.2
Police and firefighters	221,496	59.9	53.7 – 66.2	14.3	9.9 – 18.7	25.2	19.7 – 30.7
Health technologist and technicians	1,493,134	59.5	57.0 – 62.1	17.9	15.9 – 19.9	22.3	20.1 – 24.4
Officials and administrators, public administration	371,010	59.4	54.7 – 64.0	24.1	20.0 – 28.2	16.5	13.1 – 19.9
Fabricators, assemblers, inspectors and samplers	1,000,786	58.8	55.7 – 61.8	13.7	11.5 – 15.9	27.3	24.5 – 30.0
Other sales	3,818,844	58.6	56.9 – 60.2	14.1	13.0 – 15.3	27.1	25.6 – 28.6
Financial records processing	1,902,368	57.7	55.5 – 60.0	19.5	17.7 – 21.4	22.3	20.4 – 24.1
Machine operators and tenderers, except precision	1,485,822	57.6	55.1 – 60.1	13.2	11.5 – 15.0	29.1	26.8 – 31.3
Freight, stock and material handlers	916,695	57.3	54.1 – 60.6	9.9	8.0 – 11.8	32.4	29.3 – 35.4
Health service	2,366,040	56.5	54.5 – 58.5	14.5	13.0 – 15.9	28.5	26.7 – 30.3

See footnotes at end of table.

Table 17-6 (page 2 of 2). Smoking status: Estimated prevalence by current occupation, U.S. female residents age 18 and over, 1997–2004

Occupation	Estimated Population	Nonsmokers		Former Smokers		Current Smokers	
		Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval	Prevalence (%)	95% Confidence Interval
Sales representatives, commodities and finance	1,581,945	56.4	54.0 – 58.8	20.4	18.4 – 22.4	22.7	20.7 – 24.8
Managers and administrators, except public administration	5,128,297	55.9	54.6 – 57.3	21.0	19.9 – 22.1	22.8	21.6 – 23.9
Other protective service	265,936	55.7	49.6 – 61.9	13.2	9.2 – 17.2	30.7	24.9 – 36.5
Precision production	814,181	52.7	49.3 – 56.2	17.2	14.6 – 19.9	29.7	26.5 – 32.9
Supervisors and proprietors	1,544,405	52.6	50.1 – 55.2	19.6	17.6 – 21.6	27.5	25.2 – 29.7
Mail and message distributing	375,442	52.1	47.0 – 57.2	22.3	18.0 – 26.6	25.2	20.7 – 29.7
Motor vehicle operators	512,524	51.0	46.7 – 55.3	16.6	13.4 – 19.7	31.3	27.3 – 35.4
Forestry and fishing	5,338	49.6	15.0 – 84.2	35.0	4.1 – 65.9	15.4	0.0 – 42.6
Food service	3,184,026	49.1	47.3 – 50.9	12.6	11.5 – 13.8	38.0	36.3 – 39.8
Mechanics and repairers	206,714	47.5	40.9 – 54.1	20.6	15.2 – 26.1	31.4	25.1 – 37.8
Military	6,401	44.4	10.2 – 78.7	24.8	0.0 – 51.2	30.8	0.0 – 65.9
Construction laborers	26,562	39.1	22.4 – 55.8	9.0	0.0 – 21.3	51.9	34.2 – 69.5
Material moving equipment operators	76,951	38.8	28.4 – 49.1	17.4	9.3 – 25.4	42.1	31.3 – 52.9
Construction and extractive trades	154,843	36.8	28.9 – 44.6	15.0	9.4 – 20.6	46.7	38.4 – 55.0
Other transportation, except motor vehicles	4,300	36.6	0.0 – 74.0	15.1	0.0 – 42.3	48.4	10.2 – 86.6
Refused, not ascertained, don't know	2,213,477	64.7	62.7 – 66.6	10.8	9.6 – 12.1	15.1	13.6 – 16.6
TOTAL	**61,199,481**	**60.2**	**59.8 – 60.6**	**17.1**	**16.8 – 17.4**	**22.1**	**21.7 – 22.4**

NOTE: See appendices for source description and methods.
SOURCE: National Center for Health Statistics Health Interview Survey.

Appendix A
Sources of Data

Annual Survey of Occupational Injuries and Illnesses, BLS

After passage of the Occupational Safety and Health Act of 1970, the responsibility for collecting statistics on occupational injuries and illnesses was delegated to the Bureau of Labor Statistics (BLS). The BLS Annual Survey of Occupational Injuries and Illnesses, done in cooperation with participating state agencies, involves data collection by mail from a sample of an average 174,000 private industry establishments each calendar year (1996–2004). Nearly all industries in the private sector (employers covered by the Occupational Safety and Health Act of 1970) are included. Annual BLS reports of these data incorporate corresponding data from mine operators, provided to BLS by the Mine Safety and Health Administration (MSHA), and from railroad transportation employers, provided to BLS by the Federal Railroad Administration. National estimates of injury and illness incidence rates by industry are developed from the survey data. Beginning in 1992, the survey was expanded to provide more information on illnesses resulting in days away from work, allowing for more detailed classification of respiratory system diseases. The BLS reports the number and incidence rates of work-related injuries and illnesses in private industry each year. For this report, annual summary data on respiratory illnesses were abstracted from BLS annual reports on occupational injuries and illnesses.

In contrast with injury data, illness data presented in the BLS annual reports are quite limited because employers typically do not recognize and report illnesses, particularly illnesses with a long latency. Also, the survey does not cover all workers since it excludes the self-employed; farm operators with fewer than 11 employees; private households; employees in federal, state, and local government agencies; and independent mining contractors.

Since 2003, BLS has classified industry according to the 2002 North American Industry Classification System (NAICS). BLS stopped reporting 'dust diseases of the lungs' and 'respiratory conditions due to toxic agents' after 2001. Since 2002, BLS combined these conditions and reported them as a new category called 'respiratory conditions.' BLS defined these conditions as follows. 'Dust diseases of the lungs' (pneumoconioses) includes silicosis, asbestosis, coal workers' pneumoconiosis, byssinosis, siderosis, and other pneumoconioses. 'Respiratory condition due to toxic agents' includes pneumonitis, pharyngitis, rhinitis or acute congestions due to chemicals, dusts, gases or fumes. 'Respiratory conditions' includes silicosis, asbestosis, pneumonitis, pharyngitis, farmer's lung, beryllium disease, tuberculosis, occupational asthma, reactive airways dysfunction syndrome (RADS), chronic obstructive pulmonary disease (COPD), hypersensitivity pneumonitis, rhinitis or acute congestions due to chemicals, dusts, gases or fumes, siderosis, pneumonia, influenza, toxic inhalation injury such as metal fume fever, chronic obstructive bronchitis, other pneumoconioses, and other respiratory system diseases.

For more information: Office of Safety and Health Statistics, Bureau of Labor Statistics, U.S. Department of Labor, 2 Massachusetts Avenue, NE, Washington, DC 20212; and http://www.bls.gov/iif/home.htm and annual reports: *Occupational Injuries and Illnesses: Counts, Rates, and Characteristics*.

Black Lung Benefit Awards, SSA and DOL

Title IV of the Coal Mine Health and Safety Act of 1969 authorizes a benefits program, providing medical payments and cash stipends for miners totally disabled because of pneumoconiosis arising out of employment in underground coal mining, as well as for surviving spouses of coal miners whose death resulted from the disease or who were entitled to Black Lung benefits at the time of death. The Social Security Administration (SSA) was assigned initial responsibility for operating the benefits program. The Black Lung Benefits Act of 1972 continued

SSA responsibility for payments to miners granted claims before July 1973, assigned the Department of Labor (DOL) responsibility for claims filed after July 1973, and extended eligibility for benefits to surface coal miners and to surviving children of miners. This latter provision allowed children to receive benefits if both parents were deceased, or if a surviving spouse ceased to qualify for benefits through remarriage. In September 1997, in an effort to enhance customer service to Black Lung program beneficiaries, the responsibility for managing all active SSA Black Lung claims was assigned to DOL. This program change was made permanent in 2002 when the Black Lung Consolidation of Administrative Responsibility Act placed the administration of both programs with DOL.

For more information: U.S. Department of Labor, Office of Workers' Compensation Programs, 200 Constitution Avenue, NW, Washington, DC 20210 and annual reports: *Social Security Bulletin*, *Annual Statistical Supplement, 2005*; *Annual Report to Congress FY2004: Office of Workers' Compensation Programs*, U.S. Department of Labor, Employment Standards Administration; and *Black Lung Home Page* at http://www.dol.gov/esa/regs/compliance/owcp/ca_blba.htm.

Coal Workers' X-ray Surveillance Program, NIOSH

The Coal Workers' X-ray Surveillance Program (CWXSP) is a NIOSH-administered occupational health program initially mandated by the Coal Mine Health and Safety Act of 1969. The primary objective of the CWXSP is to screen miners for coal workers' pneumoconiosis (CWP). Since 1970, coal mine operators have been required to offer a chest radiograph to all workers at U.S. underground coal mines at the time of hire and again three years later. Subsequently, miners are offered radiographs at approximately five-year intervals. The examinations are done at no cost to the miners. In addition to the posterior-anterior chest x-ray, other information is collected, including miner identification, age, tenure, and specific job in the mine. Beginning in September 2005, NIOSH, in collaboration with the MSHA, initiated an outreach component for the CWXSP, labeled the Enhanced Coal Workers' Health Surveillance Program (ECWHSP). The ECWHSP uses a mobile examination unit to provide chest x-ray examinations at easily accessible locations.

The chest radiographs are read by physicians who have demonstrated proficiency to NIOSH in the use of the International Labour Office (ILO) system for classifying radiographs of the pneumoconioses. Each chest image is read by at least two readers, and a consensus rule is used to reach a final determination. The CWXSP defines radiographic evidence of CWP as a final determination of small opacity profusion category of at least 1/0 or large opacities (i.e., larger than one centimeter in diameter). Any miner with CWP on his/her chest radiograph is offered the option to work in an area of the mine with a respirable coal mine dust level of 1 mg/m^3 or less and have personal dust exposures monitored at frequent intervals.

The large numbers of chest x-ray examinations since 1970 provide a means of monitoring the prevalence of CWP among active coal miners at underground mines. Nearly all eligible miners participated during 1970–1974, while participation in the CWXSP was about 42% during the period 2000–2004. The proportion of mine operations that offered the required CWXSP radiographs increased from 90% in 2003 to 94% in 2007. Due to selective participation, the reported tenure-specific prevalence estimates may not be representative of the entire underground coal mine work force. Also, overall crude prevalence estimates may reflect over-representation of newly employed miners. Tabulations of CWXSP data presented in this report vary from those presented in some earlier editions of the Work-Related Lung Disease Surveillance Report due to revised criteria for categorizing tenure and time periods.

Miner employment figures are averages of the em-

ployment at all underground mines, as reported by mine operators once per quarter to MSHA. These figures under-represent total employment (those ever employed during the period) due to continuous turnover in the workforce during each period.

For more information: Coal Workers' Health Surveillance Program, Surveillance Branch, Division of Respiratory Disease Studies, NIOSH, 1095 Willowdale Road, Morgantown, WV 26505. Phone (304) 285-5724; and at http://www.cdc.gov/niosh/topics/surveillance/ORDS/CoalWorkersHealthSurvProgram.html.

Integrated Management Information System, OSHA

The Integrated Management Information System (IMIS) includes most of the industrial hygiene sample data from Occupational Safety and Health Administration (OSHA) compliance inspections and consultation surveys conducted since May 1979. The data are reported by OSHA compliance safety and health officers and OSHA state consultants. Each IMIS record includes sample date, substance code, airborne concentration, sample type and exposure type, occupation, OSHA permissible exposure limit (PEL), and Standard Industrial Classification codes. IMIS information is entered as events occur in the course of agency activities. Until cases are closed, IMIS entries concerning specific OSHA inspections are subject to continuing correction and updating. Therefore, numbers of samples reported for a given year, or period of years, may differ from those previously reported. NIOSH receives the data yearly from OSHA's IMIS Database.

For more information: Directorate of Information Technology, Occupational Safety and Health Administration, 200 Constitution Avenue, NW, Washington, DC 20210. Phone (202) 693-1700.

Metal/Nonmetal Mine Data, MSHA

The metal/nonmetal mine data (MNMD) are records of industrial hygiene samples collected by MSHA inspectors in non-coal surface and underground mines and mills since 1974. This report presents data since 1979, which represent both personal and area samples. Each MNMD record includes sample date, contaminant code, airborne concentration, occupation, MSHA PEL, percent silica and silica concentration where available, standard industrial classification, and the mine and/or mill at which the sample was obtained. In 1982, Congress temporarily removed the surface stone and sand and gravel industries from MSHA's jurisdiction. During this year the number of respirable dust samples collected is fewer than in other years. The quartz reference standard used for MNMD samples changed in 1988. As a result, the reported percent quartz content, quartz concentrations, and the percentage of samples exceeding the PEL increased in 1988 from 1987. MSHA occasionally revises and updates MNMD files, so the number of records reported for a given year, or period of years, may differ from previous reports.

NIOSH receives the data yearly from MSHA's TeraData Query System. It should be noted that MSHA changed the procedures used for entering data into the TeraData Query System from field entry with little or no quality assurance checks to computerized input from the Laboratory Information Management System (LIMS) with built-in quality assurance checks to minimize or eliminate data or coding errors. In short, it appears that MSHA's asbestos data in their preamble and final rule conflicts with the MSHA asbestos data in this report because of the data or coding errors existing in TeraData.

For more information: Metal and Nonmetal Health Division, Mine Safety and Health Administration, Room 2453, 1100 Wilson Boulevard, Arlington, VA 22209. Phone (202) 693-9630.

For more information on the quartz reference standard used for the MNMD samples: Dust Division, Pittsburgh Safety and Health Technology Center, Mine Safety and Health Administration, P.O. Box

18233, Pittsburgh, PA 15236. Phone (412) 386-6858.

Multiple Cause-of-Death Data, NCHS

The National Center for Health Statistics (NCHS) has made available annual public-use multiple cause-of-death data files. These files contain records of all deaths in the U.S. since 1968 (approximately two million annually) that are reported to state vital statistics offices. Each death record includes codes for up to 20 conditions listed on the death certificate, including both underlying and contributing causes of death in two fields: the entity axis, which preserves diagnostic detail for all listed conditions and their placement on the death certificate; and the record axis, which reorders the codes, removes redundancies, and (infrequently) combines some associated conditions (see *Detail Record Layout* at http://www.cdc.gov/nchs/about/major/dvs/mcd/1998mcd.htm). Other data include age, race, sex, and state and county of residence at time of death. In addition, usual industry and occupation codes are available for decedents from some states, for certain years during 1985–1999 (see Appendix E). NCHS has determined that certain quality criteria were met by usual industry and occupation data from selected states in some years.

Potential limitations of multiple cause-of-death data include: under- or over-reporting of conditions on the death certificate by certifying physicians; incomplete or no reporting of usual industry and occupation; and non-specificity of some industry and occupation codes.

For more information: Mortality Statistics Branch, Division of Vital Statistics, National Center for Health Statistics, Centers for Disease Control and Prevention, 3111 Toledo Road, Floor 7, Hyattsville, MD 20782. Phone (301) 458-4666; and http://www.cdc.gov/nchs/products/elec_prods/subject/mortmcd.htm. Also refer to the annual reports: *Vital Statistics of the United States, Vol. II Mortality (Parts A and B)*, Public Health Service, National Center for Health Statistics; and http://www.cdc.gov/nchs/products/pubs/pubd/vsus/vsus.htm and http://wonder.cdc.gov/wonder/sci_data/mort/mcmort/mcmort.asp.

For more information on usual industry and occupation codes: "Technical Appendix for 1995" at http://www.cdc.gov/nchs/about/major/dvs/mcd/1998mcd.htm.

The National Occupational Respiratory Mortality System (NORMS), available at http://webappa.cdc.gov/ords/norms.html, is a data-storage and interactive data-retrieval system developed and maintained by NIOSH. The system contains national census data (see Population Data Estimates, Bureau of the Census (BoC) and Centers for Disease Control (CDC), below) and national mortality data obtained annually from the NCHS public-use multiple cause-of-death data files (see above). For the pneumoconioses, malignant mesothelioma, and hypersensitivity pneumonitis, NORMS offers a range of search options for generating tables, charts, and maps of the number of deaths, crude death rates, age-adjusted death rates, and years of potential life lost at national, regional, state, and county levels for U.S. residents by age, race, sex, and Hispanic origin. For all of the respiratory conditions listed in Appendix C, NORMS users can tabulate deaths, years of potential life lost, and proportionate mortality ratios by usual industry and/or occupation for a subset of states and years (Appendix E), 1985–1999.

National Health Interview Survey, NCHS

The National Health Interview Survey (NHIS) is a multi-purpose health survey conducted by NCHS since 1957. It provides information on the health of the civilian, noninstitutionalized population of the U.S. NHIS data are collected annually through a personal household interview from approximately 40,000 households and include about 100,000 persons. The households selected for interview in the NHIS are a probability sample representative of the target population. The annual response rate of

the NHIS is near 90% of the eligible households in the sample. For this report, the 1997–2004 NHIS sample adult (18 years and older) interview data were used.

For more information: Division of Health Interview Statistics, National Center for Health Statistics, 3311 Toledo Road, Hyattsville, MD 20782. Phone (800) 232-4636; and http://www.cdc.gov/nchs/nhis.htm.

National Hospital Discharge Survey, NCHS

Estimated numbers of hospital discharges presented in this report have been abstracted from National Hospital Discharge Survey (NHDS) reports published by NCHS. The NHDS, conducted yearly by NCHS, collects data on the use of short-stay non-Federal hospitals in the U.S. Federal, military, and Department of Veterans Affairs hospitals were excluded in the survey. In recent years, data have been abstracted from approximately 270,000 records from about 500 hospitals. Each discharge record includes information on patient age, race, sex, ethnicity (since 1985), marital status, length of stay, source of payment (since 1977), diagnoses (principal and other diagnosis) and surgical procedures, hospital size, ownership, and region of the U.S.

Only hospitals with six or more beds for patient use and those in which the average length of stay for all patients is less than 30 days are included in the survey. One limitation of NHDS data is that they represent number of discharges, not number of patients. In addition, information is available only nationally and by region, but not by state. The NHDS relies on the completeness of hospital medical records, and findings can be influenced by diagnostic practices.

For more information: Division of Health Care Statistics, National Center for Health Statistics, 3311 Toledo Road, Hyattsville, MD 20782, and www.cdc.gov/nchs/about/major/hdasd/nhds.htm.

Occupational and Environmental Disease Surveillance Database Case Reports, AOEC

The Association of Occupational and Environmental Clinics (AOEC) has maintained a database for occupational and environmental diseases and chronic injuries since 1991. Data summarized and supplied by AOEC in three reports for 1994–1996, 1997–2000, and 2001–2004 are used in this report. The summary reports provide descriptions of cases with diagnoses associated with occupational exposures other than asbestos, asbestos exposures, and environmental exposures. They also provide description of cases with diagnoses that are probably associated with occupational or environmental exposures. For this report, diagnoses with probable associated exposures were not included in the total diagnoses. AOEC defines a case as one that must have at least one diagnosed condition that, in the physician's judgment, is more likely than not to be related to occupational or environmental exposures. A case can have up to three diagnosed conditions and each condition can have up to three hazards or exposures.

Sixteen AOEC member clinics contributed cases for the period 1994–2004; 4,720 cases had diagnoses associated with asbestos exposure and 5,280 cases had diagnoses associated with occupational exposures other than asbestos. Five clinics participated in at least nine years of the 11-year period and contributed 85% of the cases. Four other clinics contributed over 150 cases each (13% of all cases). While not necessarily representative of all patients with work-related conditions, these case reports provide insight into the types of occupational conditions being treated by occupational medicine specialists, as well as into the types of exposures that are causing or exacerbating these diseases.

For more information: Association of Occupational and Environmental Clinics, 1010 Vermont Avenue, NW, #513, Washington, DC 20005. Phone (202) 347-4976; and http://www.aoec.org.

Population Data Estimates, BoC and CDC
National population estimates are based on national, state, and county-level data from the BoC. All population estimates used to compute death rates for 1968–1999 have been obtained through the Centers for Disease Control (CDC) computer system. Estimates obtained from unmodified intercensal Demo-Detail files were used for 1970–1979 (http://wonder.cdc.gov/wonder/sci_data/census/inter/type_txt/inter708.asp) and for 1980–1989 (http://wonder.cdc.gov/wonder/sci_data/census/inter/type_txt/y8090bur.asp). The unmodified 1970 intercensal population estimates were used for 1968–1969 because no other county-level population estimates were available. Postcensal Demo-Detail estimates (http://wonder.cdc.gov/wonder/sci_data/census/post/type_txt/demo95.asp) were used for 1990–1995. Comparable postcensal estimates prepared by the BoC (http://wonder.cdc.gov/wonder/sci_data/census/post/type_txt/cen9097.asp) were used for 1996–1999. Since 2000, NCHS bridged-race estimates (http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm) have been used: for data years 2000–2002, the bridged-race vintage 2002 postcensal estimates of the resident population of the U.S. as of July 1, 2000, July 1, 2001, and July 1, 2002 (file name "pcenv2002.txt"); for data year 2003, the bridged-race vintage 2003 postcensal estimates of the resident population of the U.S. as of July 1, 2003 (file name "pcen_v2003_y03.txt"); and for data year 2004, the bridged-race vintage 2004 postcensal estimates of the resident population of the U.S. as of July 1, 2004 (file name "pcen_v2004_y04.txt"). [Note: Comparison of population statistics from Demo-Detail and BoC postcensal estimates for each year from 1990 through 1995, showed that there was a maximum annual difference of less than 0.05 percent, and a difference of 0.01 percent or less in a majority of years. State-specific differences for the same years were less than one percent for individual states, with very rare exceptions.]

For more information: *1990 Census of the Population, General Population Characteristics*, U.S. Bureau of the Census, Series 1900, CP-1; http://www.census.gov/main/www/cen1990.html; http://www.census.gov/main/www/cen2000.html. For more information on population estimates: http://www.census.gov/popest/estimates.php.

Respirable Coal Mine Dust Data, MSHA
The data consist of respirable coal mine dust measurements collected by MSHA inspectors and mine operators at surface and underground coal mines and facilities since 1970. Each record includes sample date, duration, and airborne concentration, as well as occupation and the mine or facility at which the sample was obtained. NIOSH receives the data yearly from MSHA's Laboratory Information Management System (LIMS) Database.

For more information: Information Resource Center, Mine Safety and Health Administration, P.O. Box 25367, Denver, CO 80225. Phone (303) 231-5475.

Respirable Coal Mine Quartz Dust Data, MSHA
The data consist of respirable quartz measurements collected by MSHA inspectors and mine operators at surface and underground coal mines and facilities since 1982. Each record includes sample date, duration, percent quartz, and airborne concentration, as well as occupation and the mine or facility at which the sample was obtained. NIOSH receives the data yearly from MSHA's Pittsburgh Quartz Database.

For more information: Dust Division, Pittsburgh Safety and Health Technology Center, Mine Safety and Health Administration, P.O. Box 18233, Pittsburgh, PA 15236. Phone (412) 386-6858.

Sentinel Event Notification Systems for Occupational Risks (SENSOR), NIOSH
In 1987, the National Institute for Occupational Safety and Health (NIOSH) began the SENSOR program and awarded cooperative agreements to

various state health departments and other state entities to develop models for state-based and condition-specific surveillance and preventive intervention. Two of the conditions for which states have been funded through this program were silicosis and work-related asthma (WRA). States and years funded for these two conditions are shown in Table A-1.

Table A-1. States with Silicosis (S) and/or Work-Related Asthma (A) Surveillance and Intervention Programs, by funding period, 1988–2005

State	Oct 1988 – Sept 1992	Oct 1992 – Sept 1997	Oct 1997 – Sept 2002	Oct 2002 – Sept 2005
CA		A	A, S*	A, S*
CO	A			
IL		S		
MA	A	A	A	A
MI	A, S	A, S	A, S†	A, S
NJ	A, S	A, S	A†, S	A, S
NY	A			
NC		S		
OH	S	S	S	
TX		S		
WI	A, S	S		

* Funded by NIOSH for this condition during part of this period.
† Not funded by NIOSH for this condition during this period, but continued to collaborate with NIOSH.

SENSOR Silicosis. Three states (Michigan, New Jersey, and Ohio) maintained silicosis surveillance for the full 10-year period for which SENSOR silicosis data are presented in this report (1993–2002). All three states identified potential cases using a variety of sources: review of state death certificate data, case reports from physicians, and review of hospital discharge data or direct hospital reporting to the state health department. In addition, Michigan and Ohio reviewed workers' compensation records.

In all three states, demographic, work history, and medical information used for case confirmation and description was obtained through a combination of case report review from the initial case ascertainment source, review of medical records, and follow-up telephone interview with the reported cases or their surviving next-of-kin.

California maintained a NIOSH-funded silicosis surveillance program for the last three years (2000–2002) of the 10-year period for which SENSOR silicosis data are presented in this report. California identified potential cases by reviewing data from DFR of Occupational Injury or Illness, a longstanding statewide physician reporting system linked to physician reimbursement for medical services, as well as data sources mentioned above. Demographic, work history, and medical information used for case confirmation and description was obtained through a combination of case report review from the initial case ascertainment source, review of medical records, and follow-up telephone interview with the reported cases or their surviving next of kin.

For surveillance purposes, silicosis case confirmation requires a history of occupational exposure to airborne silica dust and either or both of the following: (a) a chest radiograph or other imaging technique interpreted as consistent with silicosis, or (b) lung histopathology characteristic of silicosis (see Appendix G).

For more information: Maxfield R, Alo C, Reilly MJ, et al. Surveillance for silicosis, 1993—Illinois, Michigan, New Jersey, North Carolina, Ohio, Texas, and Wisconsin. *MMWR CDC Surveill Summ* 1997 Jan 31;46:13-28 at http://www.cdc.gov/mmwr/preview/mmwrhtml/00046046.htm.

SENSOR WRA. A total of four states (California, Massachusetts, Michigan, and New Jersey) maintained WRA surveillance programs during the 10-year period for which SENSOR WRA data are

presented in this report (1993–2002). Physician case reports were the primary ascertainment source in all four states. Massachusetts, Michigan, and New Jersey actively solicited physicians for case reports, whereas California identified potential cases by reviewing data from DFR of Occupational Injury or Illness, a longstanding statewide physician reporting system linked to physician reimbursement for medical services. In addition, Michigan and New Jersey actively solicited hospital reports and reviewed hospital discharge records for potential WRA cases. In 1993, Massachusetts began supplementing case ascertainment with review of state-wide hospital discharge data. In 2002, Michigan began supplement case ascertainment with review of state poison control data.

In all four states, surveillance staff collected demographic data, work history, and medical information for surveillance case confirmation, classification, and description purposes through a combination of the initial case ascertainment source, a review of medical records, and follow-up telephone interview with reported cases. WRA case confirmation requires a healthcare professional's diagnosis of asthma (or a related diagnosis consistent with asthma) and an association between symptoms of asthma and workplace exposures or conditions. Confirmed WRA cases are classified according to established criteria (see Appendix G). To facilitate consistency in agent coding across states, putative causes of WRA are coded using the AOEC exposure coding scheme (http://www.aoec.org/tools.htm), which flags "known asthma inducers."

For more information: Jajosky RA, Harrison R, Reinisch F, et al. Surveillance of work-related asthma in selected U.S. states using surveillance guidelines for state health departments—California, Massachusetts, Michigan, and New Jersey, 1993–1995. *MMWR CDC Surveill Summ* 1999 Jun 25;48:1-20 at http://www.cdc.gov/mmwr/preview/mmwrhtml/ss4803a1.htm.

Appendix B
Methods

MORTALITY

Number of Deaths

In this report, the number of deaths for each occupational respiratory condition is the number of decedents for which the condition was coded as a cause of death on the entity axis in the National Center for Health Statistics (NCHS) multiple cause-of-death data files. [Note: In prior editions of the *Work-Related Lung Disease Surveillance (WoRLD) Report*, the numbers of deaths were generally based on the numbers of decedents for which each condition was coded as a cause of death on the record axis. Changing to the entity axis multiple cause-of-death permits more complete ascertainment of the diseases of interest.] See *Detail Record Layout* at http://www.cdc.gov/nchs/about/major/dvs/mcd/1998mcd.htm for a discussion of the appropriate uses, advantages, and disadvantages of the multiple cause-of-death code fields (entity axis and record axis).

In this report, percentages of deaths for the pneumoconioses, malignant mesothelioma, and hypersensitivity pneumonitis that NCHS coded as the underlying cause of death are listed by year. Since 1999, deaths with underlying cause-of-death International Classification of Diseases (ICD)-10 code J65 (pneumoconiosis associated with tuberculosis) are included in the underlying cause-of-death tabulations when each specified type of pneumoconiosis is coded as a cause of death on the entity axis. Similarly, deaths with underlying cause-of-death code J92.0 (pleural plaque with presence of asbestos) are included in asbestosis underlying cause-of-death tabulations.

The sum of individual pneumoconiosis (i.e., asbestosis, coal workers' pneumoconiosis, silicosis, byssinosis, and unspecified/other pneumoconiosis) death totals may be greater than the total number of deaths for all pneumoconioses because some decedents have more than one type of pneumoconiosis listed on their death certificates. The sum of individual malignant mesothelioma (i.e., pleura, peritoneum, other sites, and unspecified) death totals may be greater than the total number of deaths for all sites because some decedents have more than one type of malignant mesothelioma listed on their death certificates. To avoid inadvertent disclosure of confidential data, county-level statistics in this report were computed for time periods that overlap with similar statistics published in the *WoRLD Report 2002* by at least 5 years (e.g., 1985–1999 and 1995–2004), and omit data from counties having less than four deaths with the condition of interest. Reported deaths are restricted to U.S. residents, 15 years or older, based on state of residence at death. Race is classified as white, black, and all others. Industry and occupation classifications are described later in this appendix.

Crude Death Rates

To compute annual cause-specific crude death rates, the total number of decedents, 15 years and older, with a specified condition coded as a cause of death on the entity axis of the NCHS data files in a given year was divided by the population, 15 years and older, of the same geopolitical unit in the same year. Race- and sex-specific rates were computed from the appropriate subsets of the data. Rates were calculated annually for each specified condition from 1968 through 2004, as well as for selected periods. Crude death rates for all conditions except malignant mesothelioma, which has only been classified as a separate condition since 1999 (see Appendix C), were computed at the national, state, and county level for the multi-year period 1995–2004. Malignant mesothelioma rates were computed for 1999–2004 at the national and state level, and for 2000–2004 at the county level. For each time period, the average annual number of decedents, 15 years and older, with a specified condition was divided by the mid-year population (2002 for malignant mesothelioma; 2000 for all other conditions), 15 years and older, of the same geopolitical unit.

Comparability ratios (http://www.cdc.gov/nchs/datawh/statab/unpubd/comp.htm) were not applied to rates. No adjustments were made to account for any potential variation in the classification of respiratory diseases and conditions across ICD revisions.

Age-Adjusted Death Rates

Age-adjusted death rates presented in this report were based on deaths with the condition of interest coded as a cause of death on the entity axis of the NCHS data files. Rates were calculated annually for each specified condition from 1968 through 2004, as well as for selected periods. For a given year, the age-adjusted rates represent the rates that would have been observed if the age-specific rates for specified age groups had occurred in a population with the same age distribution as that of the standard population. To conform with current NCHS guidelines, the U.S. Year 2000 Standard Population was used as the standard (all editions prior to the *WoRLD Report 2002* used the 1940 standard population). The specific age intervals used were 15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, and 85 years and older. Rates for the entire U.S. population and for each sex-race group were age-adjusted separately, using the same standard population.

Age-adjusted rates were computed by the direct method. First, the annual age-specific rates for the population of interest were calculated. The product of the age-specific rates and the number in the comparable age-specific group in the standard population equals the expected number of deaths per million population for each age group. The total expected numbers of deaths were then obtained by summing over all age groups. The total expected number of deaths was divided by the sum of the standard population and the resulting quotient was multiplied by 1,000,000 to produce the age-adjusted rate (per million).

Age-adjusted rates were computed at the national and state level for the multi-year period 1995–2004. Rates were computed at the county level either for up to three 10-year periods (1975–1984, 1985–1994, and 1995–2004), or for a single 5-year period (2000–2004), depending on whether or not the condition of interest was discretely classified during those time periods (see Appendix C). For each time period (1975–1984, 1985–1994, 1995–2004, and 2000–2004), age-specific rates first were computed by dividing the average annual number of deaths in each age group by the corresponding age-grouped, mid-year population (1980, 1990, 2000, and 2002, respectively) in the comparable geopolitical unit. Age-adjusted rates then were computed as described above.

Years of Potential Life Lost (YPLL)

YPLL were based on deaths with the condition of interest coded as a cause of death on the entity axis of the NCHS data files. They were calculated using the method described by the Centers for Disease Control (CDC) (*MMWR* December 19, 1986/35(2S);1s-11s at http://www.cdc.gov/mmwr/preview/mmwrhtml/00001773.htm). YPLL were calculated both to age 65 and to life expectancy. YPLL to age 65 may be considered as a loss of years from a traditional working life, while YPLL to life expectancy may be considered as a loss of years from the overall life span. To compute YPLL to life expectancy, the number of deaths in each race/sex age group (the same age intervals used for computing age-adjusted rates) first was multiplied by the difference between the mid-point of the age group and life expectancy for that race/sex age group. Life tables published annually by NCHS (http://www.cdc.gov/nchs/products/pubs/pubd/lftbls/life/1966.htm) were used to determine race/sex life-expectancies for white males, white females, black males, black females. The overall U.S. population life expectancy was used for other male and other female. To compute YPLL to age 65, the number of deaths in age groups 15–24 through 55–64 was multiplied by the difference between 65 years and the mid-point of each age group (e.g., 65 minus 20

years for the 15–24 age group). These age-specific YPLLs then were summed over all age groups to obtain total YPLLs (to life expectancy, and to age 65) for each race/sex/year from 1995–2004.

State-specific YPLLs (to life expectancy) per death also were calculated for the period 1995–2004. To calculate this index, the total number of all race/sex deaths in each age group was multiplied by the corresponding U.S. population life expectancy, then summed over all age groups to obtain the total YPLL, and then divided by the total number of deaths for each state during this time period.

Rank Order

For each state, a rank order is presented for each of several mortality measures. Depending on the specific mortality measures, a rank order of "1" indicates the greatest number of deaths, highest death rate, or highest YPLL among all states in the U.S.

Most Frequently Recorded Industries/Occupations

In this report, the ten most frequently recorded Bureau of Census (BoC) industries and occupations with at least two decedents are listed for specified causes of death (from selected states and years in Appendix E). Where more than one industry/occupation was tied for tenth place, all those that were tied are listed.

Proportionate Mortality Ratio (PMR)

The data used for PMR analyses are a subset of the NCHS multiple cause-of-death files for which usual industry and occupation codes were available and met quality criteria set by NCHS (see Appendix E for a list of states and years for which data qualified).

The PMR is defined as the observed number of deaths with the condition of interest coded as a cause of death on the entity axis of the NCHS data files in a specified industry/occupation (from selected states and years in Appendix E), divided by the expected number of deaths with that condition. The expected number of deaths is the total number of deaths in the BoC industry or occupation of interest multiplied by a proportion defined as the number of cause-specific deaths for the condition of interest in all industries/occupations, divided by the total number of deaths in all industries/occupations; this includes deaths in retired, non-paid, homemaker, and unreported industries/occupations. The PMRs in this report, and those published in the *WoRLD Report 2002*, were internally adjusted by five-year age groups (i.e., 15–19, 20–24, . . . 110–114, and 115 years and over), sex, and race (i.e., white, black, and all other). Confidence intervals were calculated assuming Poisson distribution of the data.

A PMR greater than 1.0 indicates that there were more deaths associated with the condition in a specified occupation or industry than expected. This report includes only those industries/occupations with five or more decedents with the condition of interest and a lower 95% confidence limit exceeding 1.0 (in some instances the lower 95% confidence limit may equal 1.0 due to rounding).

MORBIDITY

Prevalence (Asthma, Chronic Obstructive Pulmonary Disease, and Smoking)

The estimated prevalence of asthma, chronic obstructive pulmonary disease (COPD), and cigarette smoking was based on the 1997–2004 National Health Interview Survey (NHIS) data (http://www.cdc.gov/nchs/products/elec_prods/subject/nhis.htm). Presence of asthma was defined as a "yes" response to the question "Have you ever been told by a doctor or other health professional that you had asthma?" In this report we also included the prevalence for current asthma which was defined as a "yes" response to the question "During the past 12 months, have you had an episode of asthma or an asthma attack?" COPD was defined as a "yes" response to either of the following questions: (1)

"During the past 12 months, have you been told by a doctor or other health professional that you had chronic bronchitis?" or (2) "Have you ever been told by a doctor or other health professional that you had emphysema?" Cigarette smoking status was classified in three groups: nonsmokers, former smokers, and current smokers. Nonsmokers were defined as those who smoked less than 100 cigarettes during their entire life. Former smokers were defined as those who smoked at least 100 cigarettes in their entire life and do not currently smoke.

Data on current industry and occupation were collected from all individuals who were employed during the week before the interview took place and were coded on the basis of the revised 1987 Standard Industrial (SIC) and Occupational Classification (SOC), respectively. Due to confidentiality reasons, the industry and occupation codes were regrouped into 2-digit codes for the public use data files. These recodes were based on industry and occupation groups and subgroups consistent with the existing SIC and SOC structures. These coding categories are provided in the NHIS sample adult file section and can be accessed on the website at http://www.cdc.gov/nchs/about/major/nhis/quest_data_related_1997_forward.htm. The "Refused, not ascertained, don't know" category represents the respondents who refused to answer (2.7% of the total), didn't know the industries in which they worked (0.7% of the total), or if they supplied industry information but it could not be coded to a recognized category and appeared as "not ascertained" in the data file (0.1% of the total).

Estimated prevalence rates of asthma, COPD and smoking status by gender, current industry and occupation were calculated using sample weights and adjustment for non-responses. For asthma and COPD cases, prevalences were also calculated by their smoking status. Cases with unknown or missing information were excluded from the denominator when calculating weighted prevalence estimates based on NHIS data. SAS 9.1 software (SAS Institute Inc., Cary, NC) was used to analyze data and to calculate the estimated frequencies, variances, and prevalences with corresponding 95% confidence intervals.

Prevalence (Coal Workers' Pneumoconiosis)

Prevalence of coal workers' pneumoconiosis (CWP) is reported by tenure and time period. The Coal Workers' X-ray Surveillance Program (CWXSP) defines radiographic evidence of CWP in chest x-rays as the presence of either small opacities with a profusion category greater than or equal to ILO category 1/0, large opacities (i.e., larger than one centimeter in diameter), or both. Administrative and regulatory guidelines have varied over the life of the program. The prevalence of CWP is reported by five-year periods, beginning in 1970, with the miners stratified by their underground coal mining tenure at the time of the examination. Tenure calculations were based upon the work histories reported by each miner at the time of the examination. For miners with more than one radiograph during a five-year period, only the most recent examination in that period was used.

Incidence Rates (Occupational Respiratory Illnesses)

Estimated numbers of work-related respiratory illness (with days away from work) and incidence rates of occupational respiratory conditions due to toxic agents were generally abstracted from the BLS annual reports of occupational injuries and illnesses.

Association of Occupational and Environmental Clinics (AOEC) Diagnoses and Hazards

In this report, the frequency distributions of work-related respiratory conditions diagnosed in AOEC clinics and the respiratory hazards associated with these respiratory diagnoses were tabulated from three summary reports prepared by AOEC for 1994–1996, 1997–2000, and 2001–2004. For hazards other than asbestos, only the top two are listed and the number in parentheses represents the

number of diagnoses associated with that reported hazard. The list of the most frequently associated respiratory hazards (excluding asbestos) is a partial listing of all occupational hazards associated with the work-related respiratory conditions. All remaining occupational hazards are aggregated in an "All other" category.

Discharges from Short-Stay Non-federal Hospitals (Asbestosis, Coal Workers' Pneumoconiosis, Silicosis)

Estimated numbers of discharges from short-stay non-federal hospitals were tabulated from the National Hospital Discharge Survey (NHDS) data files provided by the NCHS. Estimated numbers were based on any mention of asbestosis, CWP, or silicosis from among the seven diagnosis codes provided in the data files for discharged patients age 15 years and older.

Work-Related Asthma (WRA): Surveillance Case Classification

In this report, Sentinel Event Notification System for Occupational Risks (SENSOR) WRA data is grouped based on case classification criteria into work-aggravated asthma (WAA) and new-onset asthma (NOA). NOA is further classified as either reactive airways dysfunction syndrome (RADS) or occupational asthma and its sub-classifications (see Appendix G: Decision Logic for Work-Related Asthma). In some instances WRA cases may meet the requirements of the surveillance case definition for a confirmed case without sufficient information for classification. These cases are noted as "unclassified."

Work-Related Asthma (WRA): Reported Putative Exposures

In this report, putative agents associated with cases of WRA were grouped using established AOEC categories and sub-categories[1] or combined individual exposure codes (e.g., AOEC code 320.01 and 320.33 were combined into a single Indoor Air Pollutants category). These categories contain agents of similar use or chemical nature. A single case of WRA may be associated with up to three putative agents and as a result may be counted in more than one category. The designation of agents as occupational asthmagens on the AOEC exposure code list is made according to a protocol (see *Revised Protocol: Criteria for Designating Substances as Occupational Asthmagens on the AOEC List of Exposure Codes* at http://www.aoec.org/content/Asthmagen_Protocol_4-9-05_revision.pdf).

EXPOSURE

Occupational Exposure Limits

Permissible Exposure Limits. The Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) each enforce regulations that establish the legal limits of workplace exposures to pneumoconiotic agents. These legal limits are described in this report as permissible exposure limits (PELs), although the regulations sometimes use the term "standard" or "exposure limit."

Although OSHA has PELs for the maritime industry [29 CFR 1915], very few samples have been collected and are not reported here.

The OSHA PELs for several pneumoconiotic agents were changed on March 1, 1989, but a legal challenge to the modified OSHA PELs was upheld, and the modified OSHA PELs reverted to the previous OSHA PELs on March 23, 1993. Therefore, data for respirable quartz, selected pneumoconiotic agents, and all pneumoconiotic agents are reported for the three time periods: 1979–1988, 1989–1992, and 1993–2003. Some pneumoconiotic agents had a substance-specific OSHA PEL only from March 1,

[1] Hunting KL, McDonald SM. Development of a hierarchical coding system for clinic-based surveillance of occupational disease and industry. *Appl Occup Environ Hyg* 1995;10(4):317–322.

Table B-1. U.S. Code of Federal Regulations (CFRs) establishing legal limits of workplace exposures to pneumoconiotic agents by industry

OSHA		MSHA	
general industry	construction industry	coal mining industry	non-coal mining industry
29 CFR 1910.1000	29 CFR 1926.55	30 CFR 70.100	30 CFR 56.5001
29 CFR 1910.1001	29 CFR 1926.1101	30 CFR 70.101	30 CFR 57.5001
29 CFR 1910.1043		30 CFR 71.100	
		30 CFR 71.101	
		30 CFR 71.700	
		30 CFR 71.702	
		30 CFR 90.100	
		30 CFR 90.101	

1989 to March 22, 1993, including: aluminum as welding fumes, respirable dust of natural graphite, mica containing less than 1% crystalline silica, tin oxide, inorganic compounds of tin oxide, fused respirable silica dust, fibrous talc not containing tremolite, talc not containing asbestos, insoluble tungsten and compounds, and welding fumes (total particulate).

The MSHA metal/nonmetal mining PELs for pneumoconiotic agents were adopted from the 1973 edition of the American Conference of Governmental Industrial Hygienists (ACGIH®) publication entitled *TLV®s Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973*. MSHA has not adopted PELs for the following pneumoconiotic agents: tin oxide dust/fume, inorganic dusts of tin, insoluble tungsten dusts/fumes, and welding fumes (total particulate). In this report, a MSHA PEL of 10 milligrams per cubic meter (mg/m^3) is used for welding fumes (total particulate) through 1993, but since then it has been MSHA policy not to collect samples for welding fumes.

OSHA and MSHA do not have PELs specific for crystalline silica. The PELs apply to respirable dust containing crystalline silica, and the allowable exposure to respirable dust is reduced as the crystalline silica content increases. The formulas for allowable exposure vary with the agency and the industry. In metal/nonmetal mining, the MSHA PEL is the same as the OSHA PEL for respirable dust containing at least 1% quartz:

$$\text{OSHA PEL} = \frac{10\ \text{mg/m}^3}{\%\ \text{Quartz} + 2}$$

However, OSHA adopted a PEL of 0.1 mg/m^3 for quartz that was enforced from March 1, 1989 through March 22, 1993.

Since December 1972, the MSHA PEL for respirable coal mine dust has been 2 mg/m^3 MRE[2] unless the quartz content of the respirable coal mine dust at the mine exceeds 5%. When the quartz content of the respirable dust exceeds 5% in a coal mine sample, the MSHA PEL is reduced based on the following formula:

$$\text{MSHA PEL} = \frac{10\ \text{mg/m}^3\ \text{MRE}}{\%\ \text{Quartz}}$$

[2] The MRE designation refers to the Mining Research Establishment of the National Coal Board, London, England. MSHA's PELs for respirable coal mine dust and respirable coal mine dust containing quartz are based on sampling criteria developed by MRE, but OSHA's are based on different sampling criteria. To clearly indicate the difference, the MSHA PELs and sample results are designated by "MRE" in this report.

The OSHA PEL of 2 fibers per cubic centimeter (f/cc) for asbestos was reduced to 0.2 f/cc on July 21, 1986, and to 0.1 f/cc on October 11, 1994. Therefore, asbestos exposures are reported for three time periods: 1979–1986, 1987–1994, and 1994–2003. The MSHA PEL for asbestos has not changed from 2 f/cc since it was adopted.

The OSHA PELs for cotton dust (raw) vary by processing operation. They are:

- 1 mg/m^3 for the cotton waste processing operations of waste recycling (sorting, blending, cleaning, and willowing) and garneting;
- 0.75 mg/m^3 for textile slashing and weaving operations;
- 0.50 mg/m^3 for textile mill waste house operations or for dust from "lower grade washed cotton" used during yarn manufacturing; and
- 0.20 mg/m^3 for yarn manufacturing and cotton washing operations.

Reporting of cotton dust data began when the process-specific OSHA PELs became effective on March 27, 1980.

Recommended Exposure Limits. NIOSH develops and periodically revises recommended exposure limits (RELs) for hazardous substances or conditions in the workplace. The RELs are then published and transmitted to OSHA and MSHA for use in promulgating legal standards. The RELs for mineral dusts and chemical hazards, including pneumoconiotic agents, are published in the NIOSH *Pocket Guide to Chemical Hazards* (NIOSH Pub. No. 2005-149). The REL for coal mine dust was adopted in September 1995, while RELs for the other pneumoconiotic agents in this report were adopted before 1979, which is the first year OSHA and MSHA data are reported. The REL for beryllium and compounds is based on cancer, rather than pneumoconiotic effects. NIOSH has no full-shift RELs for the following pneumoconiotic agents: aluminum oxide, emery, synthetic graphite, rouge, fused respirable silica dust, titanium dioxide, and welding fumes (total particulate).

Data Selection

MSHA coal mine dust. MSHA coal mine dust samples included in this report met all of the following criteria:

(1) obtained in the U.S. or one of its territories;
(2) designated by MSHA as valid;
(3) coded as "designated occupation," "non-designated occupation," "designated work position," "non-designated work position" with valid occupation codes, or "designated area" other than "intake air";
(4) not an optional operator sample.

MSHA Coal Mine Quartz. Coal mine quartz data included in this report were obtained from MSHA. The MSHA Teradata Query System (often used by other investigators) only includes some specific samples sent from the Pittsburgh database for special analysis prompted by specific actions. Coal mine quartz samples included in this report met all of the following criteria:

(1) obtained in the U.S. or one of its territories;
(2) designated by MSHA as valid;
(3) sample duration greater than zero;
(4) quartz content greater than or equal to zero;
(5) coded as "designated occupation," "non-designated occupation," "designated work position," "non-designated work position" with valid occupation codes, or "designated area" other than "intake air";
(6) not an optional operator sample.

MSHA Metal/Nonmetal Mine Data (MNMD). MSHA metal/nonmetal mine data (MNMD) included in this report met the following criteria:

(1) obtained in the U.S. or one of its territories;
(2) not duplicated by another record, as determined by a comparison of all data fields.

NIOSH staff edited the MNMD provided by MSHA to remove duplicate records and records with internal inconsistencies, similarly to the methods previously used by the U.S. Bureau of Mines for data presented in *WoRLD Report* editions published prior to 2002.

The respirable quartz exposure data in the *Silicosis and Related Exposures* section includes the following MSHA respirable dust contaminant codes: 121 (listed nuisance dust, respirable fraction, less than 1% silica), 131 (unlisted dust, respirable fraction, less than 1% silica), 521 (respirable dust, quartz fraction not analyzed), and 523 (quartz, respirable crystalline silica fraction, greater than or equal to 1% quartz). Codes 121, 131, 521, and 523 are all respirable silica dust personal air samples. The specific code is assigned based on the laboratory's analytical result, matched to the definition of the code.

OSHA Integrated Management Information System (IMIS). IMIS samples included in this report met all of the following criteria:

(1) the state code was one of the 50 U.S. states, Washington, DC, American Samoa, Guam, Puerto Rico, or the U.S. Virgin Islands;
(2) the sample type was "area" or "personal" (excludes: "bulk," "wipe," "screen," "blood," and "urine" samples);
(3) the exposure type was "time-weighted average," or "not detected" (excludes: "ceiling," "peak," "dose," "sound reading," "not analyzed," and "not valid");
(4) the indicated OSHA PEL and units were applicable to the contaminant indicated by the substance code for the recorded date of sampling.

Data Analysis for MSHA and OSHA Samples

The reported number of samples for an agent was the total number of samples meeting the above criteria. The percent of samples exceeding the PEL for an agent category was calculated as the number of samples in that category with measured exposures exceeding the PEL enforced at the time the sample was collected, divided by the total number of samples for the agent, and finally multiplying by 100. The percent of samples exceeding the REL for an agent was calculated as the number of samples in that category with measured exposure exceeding the REL, divided by the total number of samples for the agent, and multiplying by 100.

Exposures are commonly log normally distributed, rather than normally distributed. For this reason geometric mean exposures are presented in this report. To calculate a geometric mean exposure, samples less than the minimum quantifiable concentration (MQC) were assigned a value, either the (MQC/2) or (MQC/√2), depending on the distribution of samples that were quantifiable.[3] The analytical methods used to calculate the MQC for selected pneumoconiotic agents are presented in Appendix F. The calculation assumes a sample duration of 6 hours for cotton dust and 7 hours for other agents.

The OSHA and MSHA asbestos MQCs changed during the 1979–2003 period; therefore, appropriate MQCs were used for each time period.

The limit of detection of 10 micrograms was determined by the sensitivity of the balance. Results for cotton dust samples below the MQC (3.5% of all cotton dust samples) could not be assigned to a specific cotton dust processing operation and were not included in the *Byssinosis and Related Exposures* section.

The MSHA respirable coal mine quartz data are based on analyses of respirable coal mine dust samples. Not every respirable coal mine dust sample is analyzed for quartz. Therefore, in the *Coal Workers' Pneumoconiosis and Related Exposures* section, the percent of respirable coal mine dust samples

[3] Hornung R, Reed L. Estimation of average concentration in the presence of nondetectable values. *Appl Occup Environ Hyg* 1990;5:46-51.

exceeding the MSHA PEL were calculated using the MSHA PEL of 2 mg/m^3 MRE for respirable coal mine dust containing no more than 5% quartz.

For the MSHA respirable coal mine quartz data, the quartz concentration is used in calculating the geometric means. The quartz concentration is calculated using the formula:

$$\text{Quartz Concentration} = \frac{\text{(final weight - initial weight)} * \text{percent quartz / 100}}{\text{(time * 2) / 1000}} * 1.38$$

In the *Silicosis and Related Exposures* section the geometric means of exposure to quartz are reported for OSHA samples. However, the reported percentage exceeding the PEL compares only the respirable dust samples containing at least 1% quartz to the PEL for respirable dust containing at least 1% quartz. The exception is from March 1, 1989 through March 22, 1993, when OSHA enforced a PEL of 0.1 mg/m^3 for respirable quartz. During this period the percentage greater than the PEL compares the exposure to quartz to 0.1 mg/m^3.

Industries with Elevated PMRs and Most Frequently Recorded on Death Certificates

This report includes number of samples, geometric mean exposures, and percent of samples exceeding the PEL or REL by selected industries for exposure agents related to elevated occupational lung disease mortality. For asbestosis, CWP, silicosis, byssinosis, and all pneumoconiosis, separate tables present data for the ten most frequently recorded industries with five or more decedents and significantly elevated PMRs. [Note: see industry/occupation titles below.]

STATE AND COUNTY DESIGNATIONS

The "number of states" displayed on maps in this report sums to 51 because the District of Columbia is included. Counties in this report are coded according to the 1990 Federal Information Processing Standards (FIPS) Codes system. A small number of counties or county equivalents have split, merged with, or separated from surrounding or adjacent subdivisions (see Appendix H). Readers should be cautious in assessing geographic patterns and temporal trends for subdivisions that have split or merged.

INDUSTRY/OCCUPATION CODES AND TITLES

Since 1993, the 1990 Bureau of Census (BoC) Index of Industries and Occupations classification system has been used for coding death certificate information on the NCHS multiple cause-of-death data files. Most codes and titles in the 1990 system do not differ from the 1980 system. All tables reporting BoC industry (CIC) and occupation (COC) codes and titles that are presented in the mortality and exposure sections of this report, except those listed in Appendix D, follow the 1980 BoC classification system. For more information: *Technical Appendix for 1998* at http://www.cdc.gov/nchs/about/major/dvs/mcd/1998mcd.htm and pages XI-XIV in U.S. Dept. Commerce 1992, *Alphabetical Index of Industries and Occupations*, Bureau of the Census, 1990 CPH-R-3.

NIOSH established the National Occupational Research Agenda (NORA) as a partnership program to stimulate innovative research and improved workplace practices (see http://www.cdc.gov/niosh/nora/default.html). To assign CIC codes to NORA Sector Groups (see http://www.cdc.gov/niosh/nora/sector.html), the CIC codes were merged using crosswalks available at http://www.census.gov/hhes/www/ioindex/indcswk2k.pdf and http://www.census.gov/epcd/naics02/NAICS97toNAICS02.xls. The CIC codes are listed by NORA Sector Group in Appendix I.

Industry/occupation titles ranked by estimated prevalence of asthma, COPD, and smoking, which

are presented in the morbidity sections of this report, had been classified according to the 1995 SIC System and then regrouped by the NCHS. Industry-specific incidence rates of the pneumoconioses and respiratory conditions due to toxic agents follow the 1987 SIC System. Tables summarizing temporal patterns of geometric mean exposures in selected sections (i.e., asbestos, silica, and pneumoconiotic agents) of this report also group industries by the 1987 SIC System.

The primary industries associated with silicosis and work-related asthma cases in the Sentinel Event Notification System for Occupational Risks (SENSOR) sections of this report are grouped by the 1987 SIC System. However, the correspondent primary occupations are grouped by the 1990 BoC classification system (COC). In this report, industries/occupations associated with five or more silicosis or with 10 or more work-related asthma cases are listed. Industries/occupations associated with less than five silicosis or with less than 10 work-related asthma cases are aggregated in an "All other" category.

Appendix C
International Classification of Diseases (ICD) Codes

Condition (as defined for this report)	ICD-8 (1968-1978)		ICD-9 (1979-1998)		ICD-10 (since 1999)	
	Rubrics	Codes	Rubrics	Codes	Rubrics	Codes
Asbestosis	**Asbestosis**	**515.2**	**Asbestosis**	**501**	**Pneumoconiosis due to asbestos and other mineral fibers** Asbestosis	**J61***
Coal Workers' Pneumoconiosis	**Anthracosilicosis** Anthracosis Coal miners' lung	**515.1**	**Coal workers' pneumoconiosis** Anthracosilicosis Anthracosis Black lung disease Coal workers' lung Miners' asthma	**500**	**Coal workers' pneumoconiosis** Anthracosilicosis Anthracosis Coal workers' lung	**J60***
Silicosis	**Silicosis** Calcicosis Chalicosis	**515.0**	**Pneumoconiosis due to other silica or silicates** Pneumoconiosis due to talc Silicotic fibrosis (massive) of lung Silicosis (simple) / (complicated)	**502**	**Pneumoconiosis due to dust containing silica** Silicotic fibrosis (massive) of lung Pneumoconiosis due to talc dust Pneumoconiosis due to other dust containing silica	**J62***
	Silicotuberculosis Colliers' phthisis Grinders' phthisis Miners' phthisis Stonemasons' phthisis	**010**	*No discrete ICD-9 code*		*No discrete ICD-10 code*	
Byssinosis	*No discrete ICD-8 code*		**Pneumonopathy due to inhalation of other dust** Byssinosis Cannabinosis Flax-dressers' disease	**504**	**Airway disease due to specific organic dust** Byssinosis Flax-dresser's disease Cannabinosis Airway disease due to other specific organic dusts	**J66**
Unspecified/Other Pneumoconioses	**Pneumoconiosis due to inhalation of other inorganic dust** Aluminosis (of lung) Bauxite fibrosis (of lung) Berylliosis Graphite fibrosis (of lung)	**516.0**	**Pneumoconiosis due to other inorganic dust** Aluminosis (of lung) Bauxite fibrosis (of lung) Berylliosis Graphite fibrosis (of lung) Siderosis Stannosis	**503**	**Pneumoconiosis due to other inorganic dusts** Aluminosis (of lung) Bauxite fibrosis (of lung) Berylliosis Graphite fibrosis (of lung) Siderosis Stannosis Pneumoconiosis due to other specified inorganic dusts	**J63***
	Other pneumoconiosis, including unspecified Pneumoconiosis: n.o.s. due to: silicates n.e.c. talc	**515.9**	**Pneumoconiosis, unspecified**	**505**	**Unspecified pneumoconiosis**	**J64***

See footnotes at end of table.

Condition (as defined for this report)	ICD-9 (1979-1998)		ICD-10 (since 1999)	
	Rubrics	Codes	Rubrics	Codes
Malignant Mesothelioma	*No discrete ICD-9 code*		**Mesothelioma** Mesothelioma of pleura Mesothelioma of peritoneum Mesothelioma of pericardium** Mesothelioma of other sites Mesothelioma, unspecified	**C45**
Hypersensitivity Pneumonitis	**Extrinsic allergic alveolitis** Farmers' lung Bagassosis Bird-Fanciers' lung Suberosis Malt workers' lung Mushroom workers' lung Maple bark-strippers' lung Ventilation pneumonitis Other specified allergic alveolitis and pneumonitis Unspecified allergic alveolitis and pneumonitis	**495**	**Hypersensitivity pneumonitis due to organic dust** Farmer's lung Bagassosis Bird fancier's lung Suberosis Maltworker's lung Mushroom-worker's lung Maple-bark-stripper's lung Air-conditioner and humidifier lung Hypersensitivity pneumonitis due to other organic dusts Hypersensitivity pneumonitis due to unspecified organic dust	**J67**
Asthma	**Asthma** Extrinsic asthma Intrinsic asthma Asthma, unspecified	**493**	**Asthma** Predominantly allergic asthma Nonallergic asthma Mixed asthma Asthma, unspecified **Status asthmaticus** Acute severe asthma	**J45** **J46**
Chronic Obstructive Pulmonary Disease	*No data included in this report*		**Bronchitis, not specified as acute or chronic** Bronchitis: n.o.s. catarrhal with tracheitis n.o.s. Tracheobronchitis n.o.s. **Simple and mucopurulent chronic bronchitis** Simple chronic bronchitis Mucopurulent chronic bronchitis Mixed simple and mucopurulent chronic bronchitis **Unspecified chronic bronchitis** **Emphysema** MacLeod's syndrome Panlobular emphysema Centrilobular emphysema Other emphysema Emphysema, unspecified **Other chronic obstructive pulmonary disease** Chronic obstructive pulmonary disease with acute lower respiratory infection Chronic obstructive pulmonary disease with acute exacerbation, unspecified Other specified chronic obstructive pulmonary disease Chronic obstructive pulmonary disease, unspecified **Bronchiectasis**	**J40** **J41** **J42** **J43** **J44** **J47**

See footnotes at end of table.

Condition (as defined for this report)	ICD-9 (1979-1998)		ICD-10 (since 1999)	
	Rubrics	**Codes**	**Rubrics**	**Codes**
Respiratory Tuberculosis	**Primary tuberculous infection** Primary tuberculous infection Tuberculous pleurisy in primary progressive Other primary progressive tuberculosis Primary tuberculous infection, unspecified	**010**	**Respiratory tuberculosis, bacteriologically and histologically confirmed** Tuberculosis of lung, confirmed by sputum microscopy with or without culture Tuberculosis of lung, confirmed by culture only Tuberculosis of lung, confirmed histologically Tuberculosis of lung, confirmed by unspecified means Tuberculosis of intrathoracic lymph nodes, confirmed bacteriologically and histologically Tuberculosis of larynx, traches and bronchus, confirmed bacteriologically and histologically Tuberculous pleurisy, confirmed bacteriologically and histologically Primary respiratory tuberculosis, confirmed bacteriologically and histologically Other respiratory tuberculosis, confirmed bacteriologically and histologically Respiratory tuberculosis unspecified, confirmed bacteriologically and histologically	**A15**
	Pulmonary tuberculosis Tuberculosis of lung, infiltrative Tuberculosis of lung, nodular Tuberculosis of lung with cavitation Tuberculosis of bronchus Tuberculous fibrosis of lung Tuberculous bronchiectasis Tuberculous pneumonia [any form] Tuberculous pneumothorax Other specified pulmonary tuberculosis Pulmonary tuberculosis, unspecified	**011**		
	Other respiratory tuberculosis Tuberculous pleurisy Tuberculosis of intrathoracic lymph nodes Isolated tracheal or bronchial tuberculosis Tuberculous laryngitis Other specified respiratory tuberculosis	**012**		
	Miliary tuberculosis Acute miliary tuberculosis Other specified miliary tuberculosis Miliary tuberculosis, unspecified	**018**	**Respiratory tuberculosis, not confirmed bacteriologically or histologically** Tuberculosis of lung, bacteriologically and histologically negative Tuberculosis of lung, bacteriological and histological examination not done Tuberculosis of lung, without mention of bacteriological or histological confirmation Tuberculosis of intrathoracic lymph nodes, without mention of bacteriological or histological confirmation Tuberculosis of larynx, trachea, and bronchus, without mention of bacteriological or histological confirmation Tuberculous pleurisy, without mention of bacteriological or histological confirmation Primary respiratory tuberculosis without mention of bacteriological or histological confirmation Other respiratory tuberculosis, without mention of bacteriological or histological confirmation Respiratory tuberculosis unspecified, without mention of bacteriological or histological confirmation	**A16**
	Late effects of tuberculosis Late effects of respiratory or unspecified tuberculosis	137.0		
			Miliary tuberculosis Acute miliary tuberculosis of a single specified site Acute miliary tuberculosis of multiple sites Acute miliary tuberculosis, unspecified Other miliary tuberculosis Miliary tuberculosis, unspecified	**A19**
			Sequelae of tuberculosis Sequelae of respiratory and unspecified tuberculosis	B90.9

See footnotes at end of table.

Condition (as defined for this report)	ICD-9 (1979-1998)		ICD-10 (since 1999)	
	Rubrics	Codes	Rubrics	Codes
Respiratory Conditions due to Chemical Fumes and Vapors	**Respiratory conditions due to chemical fumes and vapors** Bronchitis and pneumonitis due to fumes and vapors Acute pulmonary edema due to fumes and vapors Upper respiratory inflammation due to fumes and vapors Other acute and subacute respiratory conditions due to fumes and vapors Chronic respiratory conditions due to fumes and vapors Unspecified respiratory conditions due to fumes and vapors	**506**	**Respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors** Bronchitis and pneumonitis due to chemicals, gases, fumes, and vapors Acute pulmonary edema due to chemicals, gases, fumes, and vapors Upper respiratory inflammation due to chemicals, gases, fumes, and vapors, n.e.c. Other acute and subacute respiratory conditions due to chemicals, gases, fumes, and vapors Chronic respiratory conditions due to chemicals, gases, fumes, and vapors Other respiratory conditions due to chemicals, gases, fumes, and vapors Unspecified respiratory condition due to chemicals, gases, fumes, and vapors	**J68**
Lung Cancer	*No data included in this report*		**Malignant neoplasm of trachea** **Malignant neoplasm of bronchus and lung** Main bronchus Upper lobe, bronchus or lung Middle lobe, bronchus or lung Lower lobe, bronchus or lung Overlapping lesion of bronchus and lung Bronchus or lung, unspecified	**C33** **C34**
Other Interstitial Pulmonary Diseases	*No data included in this report*		**Other Interstitial Pulmonary Diseases** Alveolar and parietoalveolar conditions Other interstitial pulmonary diseases with fibrosis Other specified interstitial pulmonary diseases Interstitial pulmonary diseases, unspecified	**J84**
Pneumonia and Influenza	*No data included in this report*		**Influenza due to identified influenza virus** Influenza with pneumonia, influenza virus identified Influenzal (broncho)pneumonia Influenza with other respiratory manifestations, influenza virus identified Influenza Influenzal: acute upper respiratory infection laryngitis pharyngitis pleural effusion Influenza with other manifestations, influenza virus identified Encephalopathy due to influenza Influenzal: gastroenteritis myocarditis (acute)	**J10**

See footnotes at end of table.

Condition (as defined for this report)	ICD-9 (1979-1998)		ICD-10 (since 1999)	
	Rubrics	Codes	Rubrics	Codes
Pneumonia and Influenza (continued)	*No data included in this report*		**Influenza, virus not identified** Influenza with pneumonia, virus not identified Influenzal (broncho)pneumonia Influenza with other respiratory manifestations, virus not identified Influenza n.o.s. Influenzal: acute upper respiratory infection laryngitis pharyngitis pleural effusion Influenza with other manifestations, virus not identified Encephalopathy due to influenza Influenzal: gastroenteritis myocarditis (acute)	**J11**
			Viral pneumonia, n.e.c. Adenoviral pneumonia Respiratory syncytial virus pneumonia Parainfluenza virus pneumonia Other viral pneumonia Viral pneumonia, unspecified	**J12**
			Pneumonia due to *Streptococcus pneumoniae* Bronchopneumonia due to *S. pneumoniae*	**J13**
			Pneumonia due to *Hemophilus influenzae* Bronchopneumonia due to *H. influenzae*	**J14**
			Bacterial pneumonia, n.e.c. Pneumonia due to *Klebsiella pneumoniae* Pneumonia due to *Pseudomonas* Pneumonia due to staphylococcus Pneumonia due to streptococcus, group B Pneumonia due to other streptococci Pneumonia due to *Escherichia coli* Pneumonia due to other aerobic Gram-negative bacteria Pneumonia due to *Serratia marcescens* Pneumonia due to *Mycoplasm pneumoniae* Other bacterial pneumonia Bacterial pneumonia, unspecified	**J15**
			Pneumonia due to other infectious organisms, n.e.c. Chlamydial pneumonia Pneumonia due to other specified infectious organisms	**J16**
			Pneumonia, organism unspecified Bronchopneumonia, unspecified Lobar pneumonia, unspecified Hypostatic pneumonia, unspecified Other pneumonia, organism unspecified Pneumonia, unspecified	**J18**

n.o.s. - not otherwise specified n.e.c. - not elsewhere classified

* A small number of deaths with underlying cause equal to ICD-10 code J65 or J92.0 are included in underlying cause of death tabulations for this condition. See methods for more detailed explanation.

** In this report, mesothelioma of the pericardium is grouped into mesothelioma of other sites.

SOURCES: U.S. Department of Health, Education, and Welfare: Eighth Revision International Classification of Diseases, Volume 1. World Health Organization, International Classification of Diseases Ninth Revision, Volume 1. World Health Organization: International Statistical Classification of Diseases and Related Health Problems 10th Revision, Volume 1.

Appendix D

Changes in Bureau of Census Industry and Occupation Codes and Titles

1980		1990	
Code	**Title**	**Code**	**Title**
Industry: 1980 codes merged into 1990 code			
382	Not specified professional equipment (manufacturing)	**392**	Not specified manufacturing industries
392	Not specified manufacturing industries		
510	Sporting goods, toys and hobby goods	**532**	Miscellaneous wholesale, durable goods
522	Not specified electrical and hardware (wholesale trade)		
532	Miscellaneous wholesale, durable goods		
730	Commercial research, development, and testing labs	**891**	Research, development and testing services
891	Noncommercial educational and scientific research		
Industry: 1980 title changed to 1990 title			
042	Crude petroleum and natural gas extraction	**042**	Oil and gas extraction
102	Canned and preserved fruits and vegetables	**102**	Canned, frozen and preserved fruits and vegetables
141	Floor coverings, except hard surface	**141**	Carpets and rugs
281	Cutlery, handtools, and other hardware	**281**	Cutlery, handtools, and general hardware
322	Electronic computing equipment	**322**	Computers and related equipment
372	Optical and health services supplies	**372**	Medical, dental, optical instruments and supplies
440	Radio and television broadcasting	**440**	Radio and television broadcasting and cable
441	Telephone (wire and radio)	**441**	Telephone communications
672	Fuel and ice dealers	**672**	Fuel dealers
701	Savings and loan associations	**701**	Savings institutions, including credit unions
712	Real estate, including real estate-insurance-law offices	**712**	Real estate, including real estate-insurance offices
751	Automotive repair shops	**751**	Automotive repair and related services
812	Offices of physicians	**812**	Offices and clinics of physicians
820	Offices of dentists	**820**	Offices and clinics of dentists
821	Offices of chiropractors	**821**	Offices and clinics of chiropractors
822	Offices of optometrists	**822**	Offices and clinics of optometrists
830	Offices of health practitioners, n.e.c.	**830**	Offices and clinics of health practitioners, n.e.c.
851	Business, trade, and vocational schools	**851**	Vocational schools
961	Homemaker, student, unemployed, volunteer	**961**	Non-paid worker or non-worker or own home/at home
Occupation: 1980 codes merged into 1990 code			
349	Telegraphers	**353**	Communications equipment operators, n.e.c.
353	Communications equipment operators, n.e.c.		
368	Weighers, measurers, and checkers	**368**	Weighers, measurers, checkers, and samplers
369	Samplers		
436	Cooks, except short-order	**436**	Cooks
437	Short-order cooks		
673	Apparel and fabric patternmakers	**674**	Miscellaneous precision apparel and fabric workers
674	Miscellaneous precision apparel fabric workers		
794	Hand grinding and polishing occupations	**795**	Miscellaneous hand working occupations
795	Miscellaneous hand working occupations		
804	Truck drivers, heavy	**804**	Truck drivers
805	Truck drivers, light		
Occupation: 1980 title changed to 1990 title			
098	Inhalation therapists	**098**	Respiratory therapists
558	Supervisors, n.e.c.	**558**	Supervisors, construction, n.e.c.
734	Printing machine operators	**734**	Printing press operators

n.e.c. - not elsewhere classified

Appendix E

States (and Years) for which Industry and Occupation Codes from Death Certificates Met NCHS Quality Criteria, 1985-1999

State	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Alaska			X	X											
Colorado	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Georgia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hawaii									X	X		X		X	X
Idaho				X	X	X	X	X	X	X	X	X	X	X	X
Indiana		X	X	X	X	X	X	X	X		X			X	X
Kansas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kentucky	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Maine	X	X	X	X	X	X	X	X	X	X	X	X		X	
Missouri	X	X													
Nebraska	X														X
Nevada	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New Hampshire	X	X	X	X	X	X	X	X	X	X	X	X		X	X
New Jersey				X	X	X	X	X	X	X	X	X	X	X	X
New Mexico		X	X	X	X	X	X	X	X	X	X	X	X	X	X
North Carolina			X	X	X	X	X	X	X	X	X	X	X	X	X
Ohio	X	X	X	X	X	X	X	X	X		X	X	X	X	
Oklahoma	X	X	X	X	X	X	X	X	X						
Rhode Island	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South Carolina	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tennessee	X	X	X	X											
Utah	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vermont		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Washington					X	X	X	X							
West Virginia				X	X	X	X	X	X	X	X	X	X	X	X
Wisconsin	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Appendix F
Exposure Categories

Table F-1. Pneumoconiotic agent categories for MSHA and OSHA data

Pneumoconiotic Agent Category (as defined for this report)	**MSHA Agents in Category**	**OSHA Agents in Category**
Asbestos	Asbestos, fibers > 5 µm in length ($3MgO2SiO_2 2H_2O$)	Asbestos [actinolite, anthophyllite, chrysotile, crocidolite, tremolite] Talc, containing fibrous tremolite
Cotton Dust		Cotton dust (raw) Flax dust*
Coal Mine Dust	Respirable coal mine dust, <= 5% quartz	
Quartz	Respirable coal mine dust, > 5% quartz Respirable dust, > 1% quartz Nuisance dust (respirable fraction), < 1% quartz** Unlisted particulate (respirable fraction), < 1% quartz** Respirable dust (not analyzed or below detection limit)**	Respirable crystalline silica (as quartz) Respirable crystalline silica/tripoli (as quartz) Respirable coal dust, > 5% quartz
Other	Aluminum oxide dust (as Al_2O_3) Aluminum oxide fume (as Al_2O_3) Antimony dusts (as Sb) Beryllium dusts (as Be) Beryllium fumes (as Be) Carbon black Cobalt dusts (as Co) Cobalt fumes (as Co) Cristobalite (respirable fraction) Graphite, natural Iron oxide fume (as Fe_2O_3) Mica Silica (Amorphous) Talc, fibers > 5 µm in length ($Mg_3Si_4O_{10}(OH)_2$) Talc, nonfibrous, < 1% quartz Tin oxide dust (as SnO_2) Tin oxide fume (as SnO_2) Tin, inorganic dusts, except SnO_2 (as Sn) Titanium dioxide dust (as TiO_2) Titanium dioxide fume (as TiO_2) Tridymite (respirable fraction) Tungsten fumes (as W) Tungsten, insoluble dusts (as W) Welding fumes (total dust)	Alpha-alumina (total dust) Alpha-alumina (respirable fraction) Aluminum oxide Aluminum (as Al), metal (total dust) Aluminum (as Al), metal (respirable fraction) Aluminum (as Al), welding fumes Antimony and compounds (as Sb) Barium (insoluble compounds) Barium sulfate (total dust) Barium sulfate (respirable fraction) Beryllium and compounds (as Be) Carbon black Cobalt, metal, fume and dust (as Co) Emery (total dust) Emery (respirable fraction) Graphite, natural (respirable fraction) Graphite, synthetic (total dust) Graphite, synthetic (respirable fraction) Iron oxide fume (as Fe_2O_3) Kaolin (total dust) Kaolin (respirable fraction) Magnesite (total dust) Magnesite (respirable fraction)* Mica (< 1% crystalline silica) Rouge (total dust) Rouge (respirable fraction) Silica, amorphous, diatomaceous earth (<1% crystalline silica) Silica, respirable cristobalite Silica, respirable tridymite Silica, fused (respirable fraction) Talc (containing no asbestos) Talc, fibrous non-tremolite Tin, inorganic compounds, except oxide (as Sn) Tin oxide (as Sn) Titanium dioxide (total dust) Tungsten and compounds (insoluble asW) Welding fumes (total dust)

MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration
* No data reported for these agents in most recent provisional data.
** See Selected Limitations section.
The following documents were reviewed to identify pneumoconiotic agents: ACGIH® *Documentation of TLV*®s, 6th edition; *Occupational Respiratory Diseases Report*, NIOSH Pub. No. 86-102; *The NIOSH Pocket Guide to Chemical Hazards*, NIOSH Pub No. 2005-149; and NIOSH Criteria Documents.

Table F-2. MSHA analytical methods for selected pneumoconiotic agents

Pneumoconiotic Agent Category (as defined for this report)	**MSHA Agents in Category**	**MSHA Analytical Method**
Asbestos	Asbestos, fibers > 5 µm in length ($3MgO \cdot 2SiO_2 \cdot 2H_2O$)	NIOSH 7400
Coal Mine Dust	Respirable coal mine dust, <= 5% quartz	NIOSH 7603/MSHA P7
Quartz	Respirable coal mine dust, > 5% quartz Respirable dust, > 1% quartz Nuisance dust (respirable fraction), < 1% quartz Unlisted particulate (respirable fraction), < 1% quartz Respirable dust (not analyzed or below detection limit)	MSHA coal: MSHA P7/NIOSH 7300 MSHA metal/nonmetal: MSHA P2/NIOSH 7500
Selected Pneumoconiotic Agents	Aluminum oxide dust (as Al_2O_3) Aluminum oxide fume (as Al_2O_3) Beryllium dusts (as Be) Beryllium fumes (as Be) Cobalt dusts (as Co) Cobalt fumes (as Co) Iron oxide fume (as Fe_2O_3) Titanium dioxide dust (as TiO_2) Titanium dioxide fume (as TiO_2)	OSHA 121/125
	Cristobalite (respirable fraction)	MSHA P2/NIOSH 7500
	Welding fumes (total dust)	OSHA 121/125
	Talc, nonfibrous, < 1% quartz	NIOSH 0600 (gravimetric)/MSHA P8 (impinger)

MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration

Table F-3. Most commonly used OSHA analytical methods for selected pneumoconiotic agents

Pneumoconiotic Agent Category (as defined for this report)	**OSHA Agents in Category**	**OSHA Compliance Analytical Method** (SLCTC)	**OSHA Consultation Analytical Method** (WOHL)
Asbestos	Asbestos [actinolite, anthophyllite, chrysotile, crocidolite, tremolite] Talc containing fibrous tremolite	ID-160	WOHL method (based on NIOSH 7400 and OSHA ID-160)
Cotton Dust	Cotton dust (raw)	1910.1043 - Appendix A; SOP for nuisance dust	WW001.6.0 (5um PVC filter)
Quartz	Respirable crystalline silica (as quartz) Respirable crystalline silica/tripoli (as quartz) Respirable coal dust, > 5% quartz	ID-142	WOHL method (based on NIOSH 7500 and OSHA ID-142)
Selected Pneumoconiotic Agents	Alpha-alumina (total dust) Aluminum oxide Antimony and compounds (as Sb) Beryllium and compounds (as Be) Cobalt, metal, fume and dust (as Co) Iron oxide fume (as Fe) Tin (Inorganic Compounds, Except oxide as Sn)	ID-125G	WW001.3.1
	Silica, respirable crystalline cristobalite	ID-142	WOHL method (based on NIOSH 7500 and OSHA ID-142)
	Carbon black	ID-196	WC019cb.4.0
	Welding fumes (total particulate)	SOP for nuisance dust	WW001.6.0 (5um PVC filter)

OSHA - Occupational Safety and Health Administration
SLCTC - Salt Lake City Technical Center WOHL - Wisconsin Occupational Health Laboratory

Appendix G
Surveillance Guidelines for State Health Departments

Silicosis

Reporting Guidelines
State health departments should encourage physicians, including radiologists and pathologists, as well as other healthcare professionals, to report all diagnosed or suspected cases of silicosis. These reports should include persons with:

A. A physician's provisional or working diagnosis of silicosis.
OR
B. A chest radiograph interpreted as consistent with silicosis.
OR
C. Pathologic findings consistent with silicosis.

State health departments should collect appropriate clinical, epidemiologic, and workplace information on reported persons with silicosis as needed to set priorities for workplace investigations.

Surveillance Case Definition
A. History of occupational exposure to airborne silica dust.*
AND EITHER OR BOTH OF THE FOLLOWING:
B1. Chest radiograph or other imaging technique interpreted as consistent with silicosis.+
B2. Pathologic findings characteristic of silicosis.§

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* Exposure settings associated with silicosis are well characterized and have been summarized in several reviews. The induction period between initial silica exposure and development of radiographically detectable nodular silicosis is usually >10 years. Shorter induction periods are associated with heavy exposures, and acute silicosis may develop within months following massive silica exposure.

\+ Cases can be classified as nodular or acute. Common radiographic findings of nodular silicosis include multiple, bilateral, and rounded opacities in the upper lung zones; other patterns have been described. Since patients may have mixed dust exposure, irregular opacities may be present or even predominant. To be considered consistent with silicosis, radiographs of nodular silicosis classified by NIOSH-certified "B" readers should have small opacity profusion categories of 1/0 or greater by the International Labour Organization classification system. If the largest opacity is >1 cm in diameter, progressive massive fibrosis [PMF] (also known as 'complicated' silicosis) is present. A bilateral alveolar filling pattern is characteristic of acute silicosis and may be followed by rapid development of bilateral small or large opacities.

§ Characteristic lung tissue pathology in nodular silicosis consists of fibrotic nodules with concentric "onion-skinned" arrangement of collagen fibers, central hyalinization, and a cellular peripheral zone, with lightly birefringent particles seen under polarized light. In acute silicosis, microscopic pathology shows a periodic acid-Schiff positive alveolar exudate (alveolar lipoproteinosis) and a cellular infiltrate in the alveolar walls.

Work-Related Asthma

Reporting Guidelines

State health departments should encourage healthcare professionals to report all diagnosed or suspected cases of asthma that are caused by or exacerbated by workplace exposures or conditions. Reported cases should include asthma caused by sensitizers or irritants and should include cases of reactive airways dysfunction syndrome (RADS).

Surveillance Case Definition

A. Healthcare professional's diagnosis consistent with asthma.*

AND

B. An association between symptoms of asthma and work.+

Surveillance Case Classification Criteria (see next page)

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* Asthma is a chronic condition characterized by inflammation of the tracheobronchial tree associated with increased airways responsiveness to a variety of stimuli. Symptoms of asthma include episodic wheezing, chest tightness, cough, and dyspnea, or recurrent attacks of bronchitis with cough and sputum production. The primary physiologic manifestation of airways hyperresponsiveness is variable or reversible airflow obstruction. It is commonly demonstrated by significant changes in the forced expiratory volume in 1 second (FEV_1) or peak expiratory flow rate (PEFR). Airflow changes can occur spontaneously, with treatment, with a precipitating exposure, or with diagnostic maneuvers such as nonspecific inhalation challenge.

\+ Patterns of association can vary and include: (1) symptoms of asthma that develop or worsen after a worker starts a new job or after new materials are introduced on a job (a substantial period can elapse between initial exposure and development of symptoms); (2) symptoms that develop within minutes of specific activities or exposures at work; (3) delayed symptoms that occur several hours after exposure (e.g., during the evenings of workdays); (4) symptoms that occur less frequently or not at all on days away from work and on vacations; (5) symptoms that occur more frequently when the affected worker returns to work; and (6) symptoms that are temporally associated with workplace exposure to an agent with irritant properties. Work-related changes in medication requirements can accompany these symptom patterns.

Work-Related Asthma (continued)

Surveillance Case Classification Criteria (see decision logic on next page)

C1) Increased asthma symptoms or increased use of asthma medication (upon entering an occupational exposure setting) experienced by a person with preexisting asthma who was symptomatic or treated with asthma medication within the two years prior to entering that occupational setting.

C2) New asthma symptoms that develop within 24 hours after a one-time high-level inhalation exposure (at work) to an irritant gas, fume, smoke, or vapor and that persist for at least three months.

C3) Workplace exposure to an agent previously associated with occupational asthma.*

C4) Work-related changes in serially measured forced expiratory volume in one second (FEV_1) or peak expiratory flow rate (PEFR).+

C5) Work-related changes in bronchial responsiveness as measured by serial nonspecific inhalation challenge testing.§

C6) Positive response to specific inhalation challenge testing¶ with an agent to which the patient has been exposed at work.

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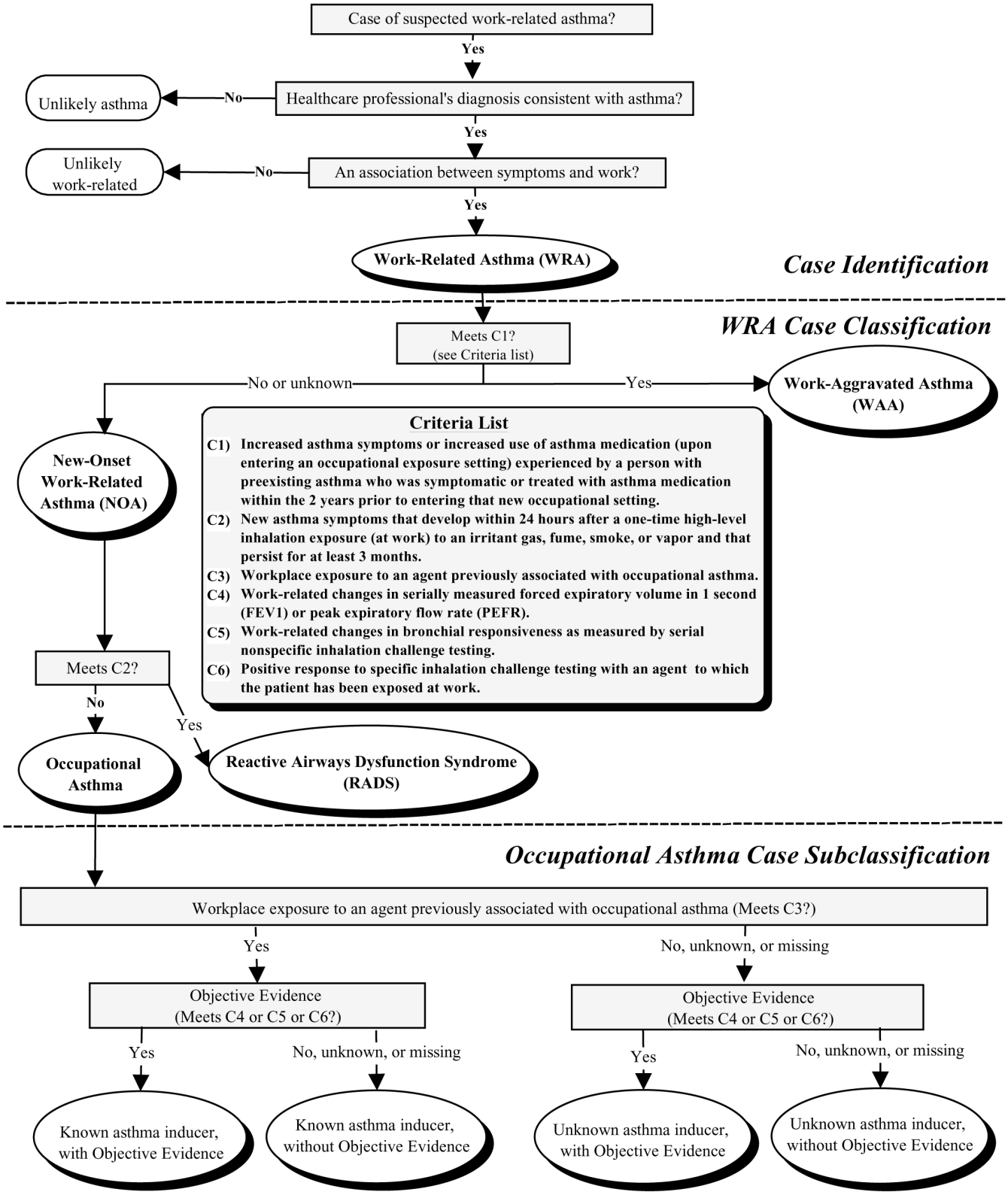
* Many agents can induce occupational asthma via a specific hypersensitivity mechanism. A comprehensive list of these asthma inducers is used for this criterion. Known asthma inducers have been designated with the letter "A" in the Association of Occupational and Environmental Clinics (AOEC) coding scheme (www.aoec.org/aoeccode.htm).

\+ Spirometric measurements (e.g., FEV_1) can be obtained before and after a person's work shift (i.e., cross-shift spirometry). However, many cases of occupational asthma can fail to demonstrate a significant cross-shift reduction in FEV_1, either because of a delayed bronchoconstrictor response or because of intermittent exposure patterns. Cross-shift spirometry testing on multiple days might help confirm the association with work. Alternatively, PEFR can be measured serially throughout the day on multiple days at and away from work using a portable peak flow meter.

§ Changes in bronchial responsiveness can be measured by serial inhalation challenge testing with nonspecific agents (e.g., using methacholine or histamine). Evidence of work-relatedness is manifested by increased bronchial responsiveness (i.e., bronchoconstriction at lower inhaled doses of methacholine or histamine) following work exposures and decreased or normal bronchial responsiveness after a period away from work.

¶ Specific inhalation challenge testing has distinct objectives, including the following: (1) identifying previously unrecognized causes of occupational asthma; (2) confirming a diagnosis of occupational asthma; and (3) identifying the causative agent when more than one allergen is present in the occupational environment and identification of the causative agent is essential for management. Specific inhalation challenge testing is potentially dangerous and should be performed by experienced personnel in a hospital setting where resuscitation facilities are available and frequent observations can be made over sufficient time to monitor for delayed reactions. Specific inhalation challenge testing is usually not necessary for clinical diagnosis of occupational asthma.

Decision Logic for Work-Related Asthma



Appendix H

Split, Merged, or Renamed Counties and County Equivalents

State	Subdivision	County Representation in this Report		
		Same*	Other	
Alaska	Aleutian Islands	-	Aleutians East Borough	1968–1993
	Aleutians West Census Area	Since 1994	**	**
	Anchorage District	-	Anchorage Borough	1968–1981
	Bethel District	-	Bethel Census Area	1968–1981
	Kuskokwim District	-		1968–1981
	Bristol Bay Division	-	Bristol Bay Borough	1968–1981
	Dillingham Census Area	Since 1982		1968–1981
	Lake and Peninsula Borough	Since 1994	Dillingham Census Area	1982–1993
	Southeast Fairbanks Census Area	Since 1982	Fairbanks North Star Borough	1968–1981
	Fairbanks District	-		1968–1981
	Juneau District	-	Juneau Borough	1968–1981
	Kenai-Cook Inlet District	-	Kenai Peninsula Borough	1968–1981
	Seward District	-		1968–1981
	Ketchikan District	-	Ketchikan Gateway Borough	1968–1981
	Kodiak District	-	Kodiak Island Borough	1968–1981
	Palmer-Wasilla District	-	Matanuska-Susitna Borough	1968–1981
	Nome District	-	Nome Census Area	1968–1981
	Barrow District	-	North Slope Borough	1968–1981
	Kobuk District	-	Northwest Arctic Borough	1968–1981
	Kobuk Borough	-		1982–1993
	Outer Ketchikan District	-	Prince of Wales-Outer Ketchikan Census Area	1968–1981
	Prince of Wales District	-		1968–1981
	Sitka District	-	Sitka Borough	1968–1981
	Haines Borough	Since 1982	Skagway-Yakutat-Angoon Census Area	1968–1981
	Lynn Canal-Icy District	-		1968–1981
	Skagway-Yakutat District	-		1968–1981
	Skagway-Hoonah-Angoon Census Area	-		1994–1999
	Yakutat Census Area	-		1994–1999
	Cordova-McCarthy District	-	Valdez-Cordova Census Area	1968–1981
	Valdez-Chitina-Whittier District	-		1968–1981
	Wade Hampton District	-	Wade Hampton Census Area	1968–1981
	Wrangell District	-	Wrangell-Petersburg Census Area	1968–1981
	Upper Yukon District	-	Yukon-Koyukuk Census Area	1968–1981
	Yukon-Koyukuk District	-		1968–1981
	Denali Borough	-		1994–1999
Arizona	La Paz County	Since 1994	Yuma County	1968–1993
Colorado	Broomfield County	-	Adams, Boulder, Jefferson, and Weld Counties***	Since 2001
Florida	Miami-Dade County	-	Dade County	Since 1999
Hawaii	Kalawao County	Since 1982	Maui County	1968–1981
New Mexico	Cibola County	Since 1982	Valencia County	1968–1981
New York	Bronx Borough	-	Bronx County	1968–1981
	Brooklyn Borough	-	Kings County	1968–1981
	Manhattan Borough	-	New York County	1968–1981
	Queens Borough	-	Queens County	1968–1981
	Staten Island Borough	-	Richmond County	1968–1981
South Dakota	Washabaugh County	-	Jackson County	1968–1979
Virginia	Clifton Forge City	1968–1999	Alleghany County	Since 2000
	Waynesboro City	Since 1970	Augusta County	1968–1969
	Portsmouth City	Since 1970	Chesapeake City	1968–1969
	Virginia Beach City	Since 1970		1968–1969
	Winchester City	Since 1970	Frederick County	1968–1969
	South Boston City	1968–1995	Halifax County	Since 1996
	Williamsburg City	Since 1970	James City County	1968–1969
	Manassas City	Since 1982	Prince William County	1968–1981
	Manassas Park City	Since 1982		1968–1981
	Nansemond County	-	Suffolk City	1968–1974
	Nansemond City	-		1970–1981
	Poquoson City	Since 1982	York County	1968–1981

- indicates subdivisions that no longer existed as of the 1990 Census, or were renamed or split after the 1990 Census.
* During the indicated years, population and mortality data are assigned to the subdivision itself.
** All data from Aleutian Islands (1968-1993) were assigned to Aleutians East Borough.
*** Because Broomfield County is not coded on the multiple cause-of-death mortality files, the population of Broomfield County was reallocated back into the counties from which it ceded (Adams, Boulder, Jefferson, and Weld) in proportion to the population of those counties in 1999.
NOTE: The primary political divisions of most states are termed counties. Prior to 1982, Alaskan county equivalents were called districts, divisions, or islands. Since 1982, Alaskan county equivalents were reclassified as boroughs or census areas. Virginia has many county-equivalent cities that are or were independent of any county organization.

Appendix I
Bureau of Census Industry Codes by NORA Sector Group

Agriculture, Forestry, and Fishing

CIC	Industry
010	Agricultural production, crops
011	Agricultural production, livestock
020	Agricultural services, except horticultural
030	Forestry
031	Fishing, hunting, and trapping
230	Logging

Construction

CIC	Industry
060	Construction

Healthcare and Social Assistance

CIC	Industry
812	Offices and clinics of physicians
820	Offices and clinics of dentists
821	Offices and clinics of chiropractors
822	Offices and clinics of optometrists
830	Offices and clinics of health practitioners, n.e.c.
831	Hospitals
832	Nursing and personal care facilities
840	Health services, n.e.c.
861	Job training and vocational rehabilitation services
862	Child day care services
870	Residential care facilities, without nursing
871	Social services, n.e.c.

Manufacturing

CIC	Industry
100	Meat products
101	Dairy products
102	Canned, frozen and preserved fruits and vegetables
110	Grain mill products
111	Bakery products
112	Sugar and confectionery products
120	Beverage industries
121	Miscellaneous food preparations and kindred products
122	Not specified food industries
130	Tobacco manufactures
132	Knitting mills
140	Dyeing and finishing textiles, except wool and knit goods
141	Carpets and rugs
142	Yarn, thread, and fabric mills
150	Miscellaneous textile mill products
151	Apparel and accessories, except knit
152	Miscellaneous fabricated textile products
160	Pulp, paper, and paperboard mills
161	Miscellaneous paper and pulp products
162	Paperboard containers and boxes

(Manufacturing, continued)

CIC	Industry
172	Printing, publishing, and allied industries, except newspapers
180	Plastics, synthetics, and resins
181	Drugs
182	Soaps and cosmetics
190	Paints, varnishes, and related products
191	Agricultural chemicals
192	Industrial and miscellaneous chemicals
200	Petroleum refining
201	Miscellaneous petroleum and coal products
210	Tires and inner tubes
211	Other rubber products, and plastics footwear and belting
212	Miscellaneous plastics products
220	Leather tanning and finishing
221	Footwear, except rubber and plastic
222	Leather products, except footwear
231	Sawmills, planning mills, and millwork
232	Wood buildings and mobile homes
241	Miscellaneous wood products
242	Furniture and fixtures
250	Glass and glass products
251	Cement, concrete, gypsum, and plaster products
252	Structural clay products
261	Pottery and related products
262	Miscellaneous nonmetallic mineral and stone products
270	Blast furnaces, steelworks, rolling and finishing mills
271	Iron and steel foundries
272	Primary aluminum industries
280	Other primary metal industries
281	Cutlery, hand tools, and general hardware
282	Fabricated structural metal products
290	Screw machine products
291	Metal forgings and stampings
292	Ordnance
300	Miscellaneous fabricated metal products
301	Not specified metal industries
310	Engines and turbines
311	Farm machinery and equipment
312	Construction and material handling machines
320	Metalworking machinery
321	Office and accounting machines
322	Computers and related equipment
331	Machinery, except electrical, n.e.c.
332	Not specified machinery
340	Household appliances
341	Radio, T.V. and communication equipment
342	Electrical machinery, equipment, and supplies, n.e.c.
350	Not specified electrical machinery, equipment, and supplies
351	Motor vehicles and motor vehicle equipment
352	Aircraft and parts
360	Ship and boat building and repairing
361	Railroad locomotives and equipment
362	Guided missiles, space vehicles, and parts
370	Cycles and miscellaneous transportation equipment
371	Scientific and controlling instruments

(Manufacturing, continued)

CIC	Industry
372	Medical, dental, optical instruments and supplies
380	Photographic equipment and supplies
381	Watches, clocks, and clockwork operated devices
390	Toys, amusement, and sporting goods
391	Miscellaneous manufacturing industries
392	Not specified manufacturing industries

Mining

CIC	Industry
040	Metal mining
041	Coal mining
042	Oil and gas extraction
050	Nonmetallic mining and quarrying, except fuel

Services

CIC	Industry
021	Horticultural services
171	Newspaper publishing and printing
440	Radio and television broadcasting and cable
441	Telephone communications
442	Telegraph and miscellaneous communication services
641	Eating and drinking places
700	Banking
701	Savings institutions, including credit unions
702	Credit agencies, n.e.c.
710	Security, commodity brokerage, and investment companies
711	Insurance
712	Real estate, including real estate-insurance offices
721	Advertising
722	Services to dwellings and other buildings
731	Personnel supply services
732	Business management and consulting services
740	Computer and data processing services
741	Detective and protective services
742	Business services, n.e.c.
750	Automotive services, except repair
751	Automotive repair and related services
752	Electrical repair shops
760	Miscellaneous repair services
761	Private households
762	Hotels and motels
770	Lodging places, except hotels and motels
771	Laundry, cleaning, and garment services
772	Beauty shops
780	Barber shops
781	Funeral service and crematories

(Services, continued)

CIC	Industry
782	Shoe repair shops
790	Dressmaking shops
791	Miscellaneous personal services
800	Theaters and motion pictures
801	Bowling alleys, billiard and pool parlors
802	Miscellaneous entertainment and recreation services
841	Legal services
842	Elementary and secondary schools
850	Colleges and universities
851	Vocational schools
852	Libraries
860	Educational services, n.e.c.
872	Museums, art galleries, and zoos
880	Religious organizations
881	Membership organizations
882	Engineering, architectural, and surveying services
890	Accounting, auditing, and bookkeeping services
891	Research, development and testing services
892	Miscellaneous professional and related services
900	Executive and legislative offices
901	General government, n.e.c.
910	Justice, public order, and safety
921	Public finance, taxation, and monetary policy
922	Administration of human resources programs
930	Administration of environmental quality and housing programs
931	Administration of economic programs
932	National security and international affairs
942	Military

Transportation, Warehousing, and Utilities

CIC	Industry
400	Railroads
401	Bus service and urban transit
402	Taxicab service
410	Trucking service
411	Warehousing and storage
412	U.S. Postal Service
420	Water transportation
421	Air transportation
422	Pipe lines, except natural gas
432	Services incidental to transportation
460	Electric light and power
461	Gas and steam supply systems
462	Electric and gas, and other combinations
470	Water supply and irrigation
471	Sanitary services
472	Not specified utilities

Wholesale and Retail Trade

CIC	Industry
500	Motor vehicles and equipment
501	Furniture and home furnishings
502	Lumber and construction materials
511	Metals and minerals, except petroleum
512	Electrical goods
521	Hardware, plumbing, and heating supplies
530	Machinery, equipment, and supplies
531	Scrap and waste materials
532	Miscellaneous wholesale, durable goods
540	Paper and paper products
541	Drugs, chemicals, and allied products
542	Apparel, fabrics, and notions
550	Groceries and related products
551	Farm-product raw materials
552	Petroleum products
560	Alcoholic beverages
561	Farm supplies
562	Miscellaneous wholesale, nondurable goods
571	Not specified wholesale trade
580	Lumber and building material retailing
581	Hardware stores
582	Retail nurseries and garden stores
590	Mobile home dealers
591	Department stores
592	Variety stores
600	Miscellaneous general merchandise stores
601	Grocery stores
602	Dairy products stores
610	Retail bakeries
611	Food stores, n.e.c.

(Wholesale and Retail Trade, continued)

CIC	Industry
612	Motor vehicle dealers
620	Auto and home supply stores
621	Gasoline service stations
622	Miscellaneous vehicle dealers
630	Apparel and accessory stores, except shoe
631	Shoe stores
632	Furniture and home furnishings stores
640	Household appliances, TV, and radio stores
642	Drug stores
650	Liquor stores
651	Sporting goods, bicycles, and hobby stores
652	Book and stationery stores
660	Jewelry stores
661	Sewing, needlework, and piece goods stores
662	Mail order houses
670	Vending machine operators
671	Direct selling establishments
672	Fuel dealers
681	Retail florists
682	Miscellaneous retail stores
691	Not specified retail trade

Decedents with Unclassified Industry

CIC	Industry
951	Retired, with no other industry reported
961	Non-paid worker or non-worker or own home/at home
990	Industry not reported

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