

OCCUPATIONAL HEALTH

TRENDS IN

NORTH CAROLINA

May 2006



North Carolina Department of Health and Human Services
Division of Public Health
Occupational and Environmental Epidemiology Branch
Occupational Health Surveillance Unit

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OVERVIEW

The personal health and economic costs of occupational injury and illness in North Carolina are considerable. During 2003, **every week** an average of 3.5 persons in North Carolina died from an injury suffered at work; 1,015 sustained injuries and illnesses which required days away from work, job transfer or restriction; and another 1,002 sustained injuries and illnesses which were considered serious enough to be reported but did not require time away from work. In 2003, approximately 94.5% of the total illnesses and injuries reported were injuries and 5.5% were illnesses.

North Carolina data suggest that certain high-risk industries and special populations need to be inspected more closely. The largest numbers of traumatic occupational deaths are consistently found in agriculture, forestry, and fishing; construction; and transportation. For example, in 2003, the fatality rates in agriculture, forestry, and fishing were 5.2 times the overall private-sector rates. Other high-risk industries include the construction industry where the fatality rate for 2003 was 2.6 times the overall fatality rate, and transportation where the fatality rate in 2003 was 2 times the overall fatality rate. Other groups requiring close attention are special populations such as older workers and Hispanic workers. [3:266, 277, 283]

What is an Occupational Health Indicator? "An occupational health indicator is a specific measure of a work-related disease or injury, or a factor associated with occupational health, such as workplace exposures, hazards, or interventions, in a specified population. These indicators can be generated by states to track trends in the occupational health status of the working population." CSTE, 2005¹

The fatality rate for older workers in 2003 was twice that of the overall population and the rate for Hispanic workers was 1.6 times that of the overall population. North Carolina has an extremely fast-growing Hispanic population that is found predominately in the agriculture, service, and construction industries.

In addition to personal health costs, costs to the economy are also a great burden in North Carolina. The total benefits paid in

2003 for workers' compensation claims were estimated to be \$1,059,960,000 and the total cost per workers' compensation claim file for in-hospital cost had soared from \$9,249 in 1995 to almost \$25,000 by 2004.

A number of data sources exist to describe the nature and magnitude of occupational injuries and illnesses. These data systems have advantages as well as limitations. However, no comprehensive state occupational reporting system currently exists for injuries, illnesses and deaths. Therefore, public health professionals and policymakers must rely on estimates for the magnitude of these occupational health problems. Some of the problems associated with these data bases include: underreporting of occupational injuries and illnesses; inadequate recognition of occupational injuries and illnesses; difficulty in attributing diseases such as silicosis and asbestosis because of the long latency period; exclusion of certain at-risk populations from surveillance (e.g., self-employed, military, many agricultural workers); and coding discrepancies for injuries, illnesses, and deaths.¹ Although these estimates generally are thought to underestimate the true extent of occupational health problems, they are considered to provide the best available information. Obtaining data from such a variety of

sources affects the time periods for which data is provided in this report. Some data is available much sooner than other data. Also, other data is not easily available for earlier years.

Two national initiatives have guided the development of this report. For the past three years, the North Carolina Occupational Health Surveillance Unit (OHSU) staff has been a part of the Council of State and Territorial Epidemiologists (CSTE) Occupational Health Workgroup, which has worked collaboratively with the National Institute for Occupational Safety and Health (NIOSH) on a project to develop a national set of occupational health indicators that allow states to measure the baseline health of their populations and the changes that take place over time. Such an undertaking is an essential step in ensuring that core occupational health surveillance is taking place in states. Indicators from that project were selected to include in this report. These include:

- ❖ Non-Fatal Injuries and Illnesses Reported by Employers
- ❖ Fatal Work-Related Injuries
- ❖ Amputations Reported by Employers
- ❖ Hospitalizations for Work-Related Burns
- ❖ Musculoskeletal Disorders Reported by Employers
- ❖ Pneumoconiosis Hospitalizations
- ❖ Acute Work-Related Pesticide Poisonings Reported to Poison Control Centers
- ❖ Incidence of Malignant Mesothelioma
- ❖ Elevated Blood Lead Levels Among Adults
- ❖ Workers Employed in Industries with High Risk for Occupational Morbidity
- ❖ Workers Employed in Occupations with High Risk for Occupational Morbidity
- ❖ Workers Employed in Industries and Occupations with High Risk for Occupational Mortality

Healthy People 2010² was also used as a way to identify indicators. This report has expanded on the fatal injuries and the non-fatal injuries and illnesses to include examination of major industrial groups, overexertion and repetitive motion injuries, work-related assaults, and occupational skin diseases.

This report is the first occupational surveillance report produced by the North Carolina Division of Public Health, Occupational Health Surveillance Unit (OHSU). As more surveillance data is examined, the OHSU will be able to define more clearly the pressing issues in occupational health and to provide prevention guidance to employers, employees, and other stakeholders.

¹Council of State and Territorial Epidemiologists. *Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000*. September 2005: 1-3.

²U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.

EMPLOYMENT DEMOGRAPHICS PROFILE

Before considering North Carolina's work-related illnesses and injuries, it is important to consider the characteristics of its workforce. Workforce characteristics can have an impact on rates of work-related illnesses and injuries.

Between 1970 and 1990, the percentage of females in the workforce increased about 16%. [See Figure 1.] The percentage of females in 2000 remained approximately the same as in 1990. As illustrated by Figure 2, the percentage of young workers (ages 16-17) declined between 1995 and 2004 from 2 to 1.1. Figure 2 also shows that, during that same time period, the percentage of workers age 65 or older ranged from a low of 2.0% in 1999 to a high of 3.7% in both 1996 and 2004. So, while this percentage was decreasing for a period of time, it has been increasing since 1999. As shown in Figure 3, racial composition has not changed much – in 1997, blacks composed 19.4% of the North Carolina workforce and other racial minorities composed 3.4%. By 2003, blacks were 18.4% of the workforce and other racial minorities composed 4.7%. Hispanics have shown a significant increase in the workforce – from 2.7% in 1997 to 7.1% in 2003 (a 163% increase in just six years!).

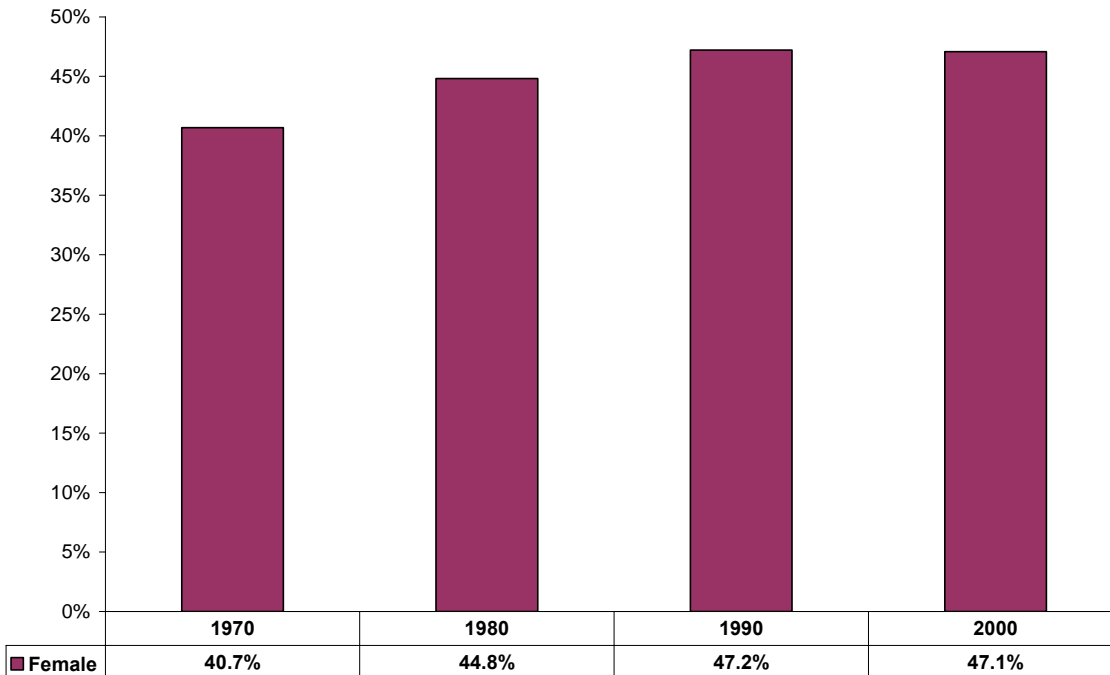
Hispanics have shown a significant increase in the North Carolina workforce – from 2.7% in 1997 to 7.1% in 2003 (a 163% increase in just six years!).

There are also some changes in the distribution of the work-force in the major industry and occupation classifications. As seen in Figure 5, the percentage of persons employed in service industries increased from 18.6 to 23.1 (a 24% increase) and persons employed in construction increased

from 5.8 to 7 (a 21% increase) from 1997 to 2002. For the same time period, the percentage of persons employed in manufacturing decreased from 23.3 to 16.7 (an almost 27% decrease). For the occupational distribution, service occupations increased from 11.4% to 13.8% (a 21% increase) while machine operators/assemblers/inspectors decreased from 10.3% to 7.2% (a 30% decrease).

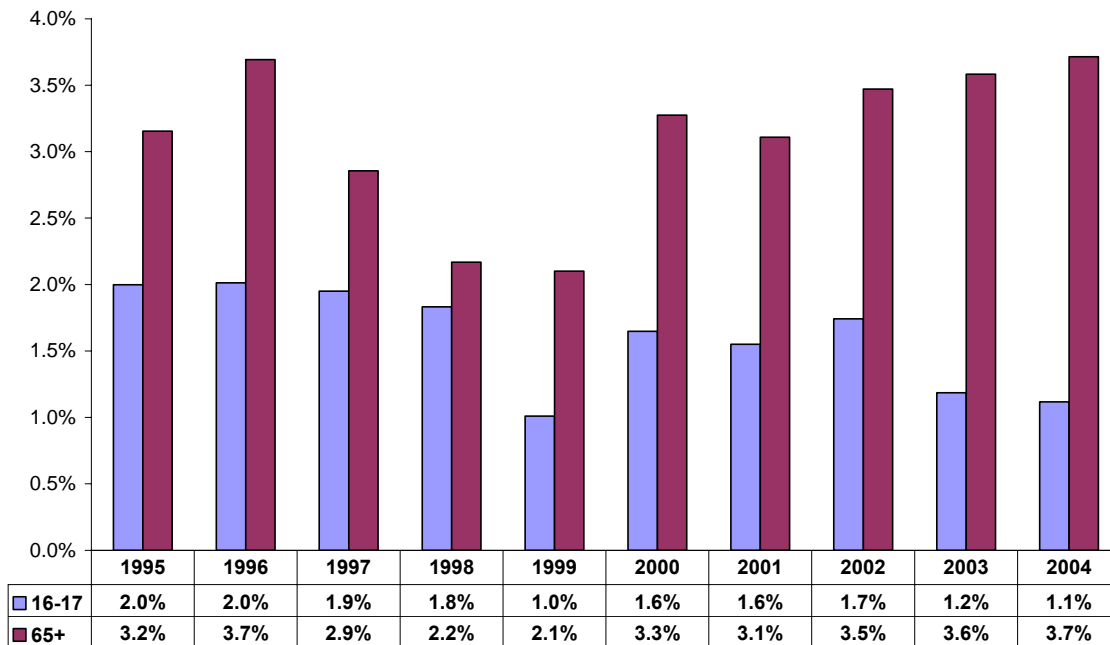
As shown in Figure 7, between 1995 and 2004 the unemployment rate ranged from a low of 3.2 in 1999 to a high of 6.7 in 2002. From Figure 8, it can be seen that between 1999 and 2002, the self-employed percentage dropped from 7.7 to 6.8. As illustrated in Figure 9, between 1997 and 2002 part-time employment ranged from a low of 13.8% in 2000 to the 2002 high of 16.1%. From Figure 10, it can be seen that, in 1999, 30% of persons were working less than 40 hours and 29% were working more than 40 hours; in 2002, 35% were working less than 40 hours and 27% were working more than 40 hours.

Figure 1: Females as Percentage of North Carolina Employment: 1970 - 2000



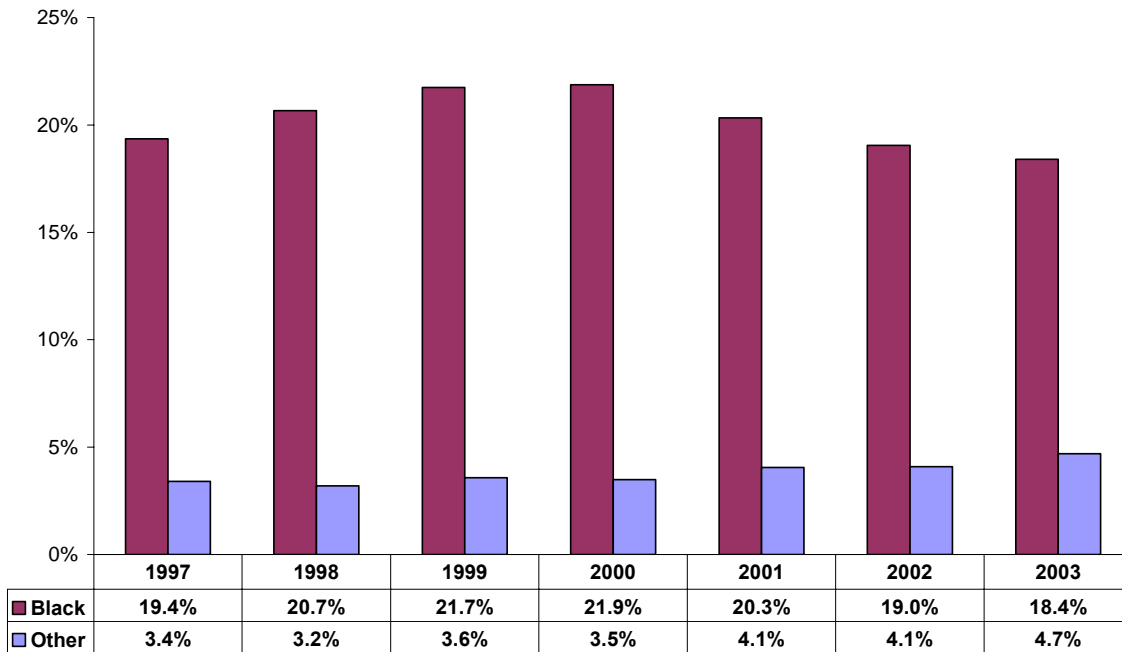
DATA SOURCE: Federal Agency Data: Bureau of the Census -- Census of Population and Housing.

Figure 2: Younger and Older Persons as Percentage of North Carolina Civilian Workforce: 1995 - 2004



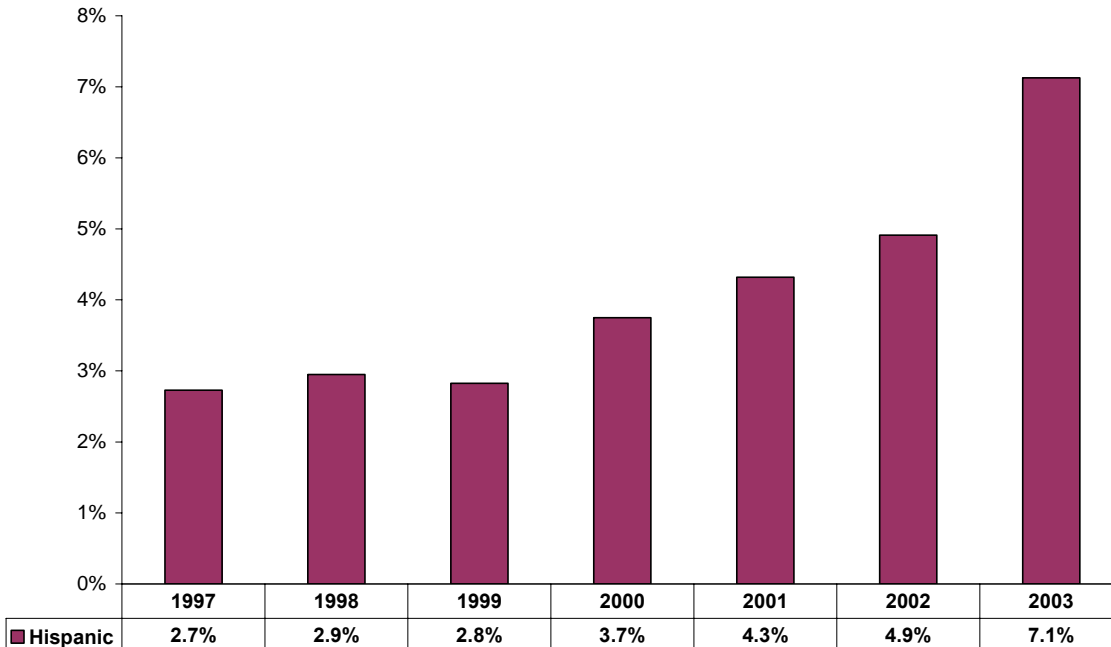
DATA SOURCE: Bureau of Labor Statistics' Current Population Survey, Annual Social and Economic Supplement (March).

Figure 3: Black and Other Racial Minority Persons as Percentage of North Carolina Civilian Workforce: 1997 - 2003



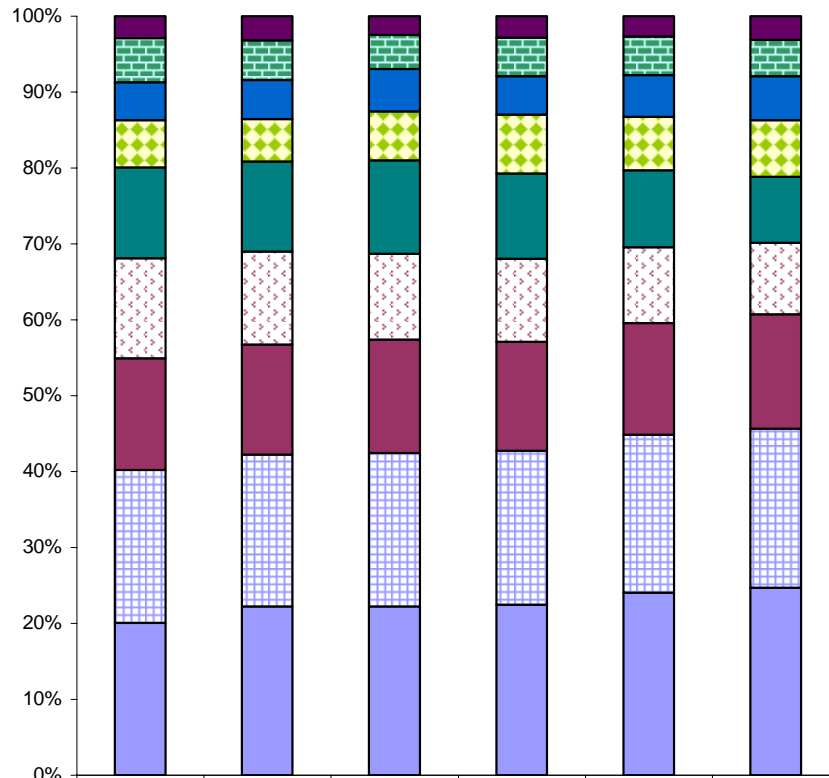
DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

Figure 4: Hispanic Persons as Percentage of North Carolina Civilian Workforce: 1997 - 2003



DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

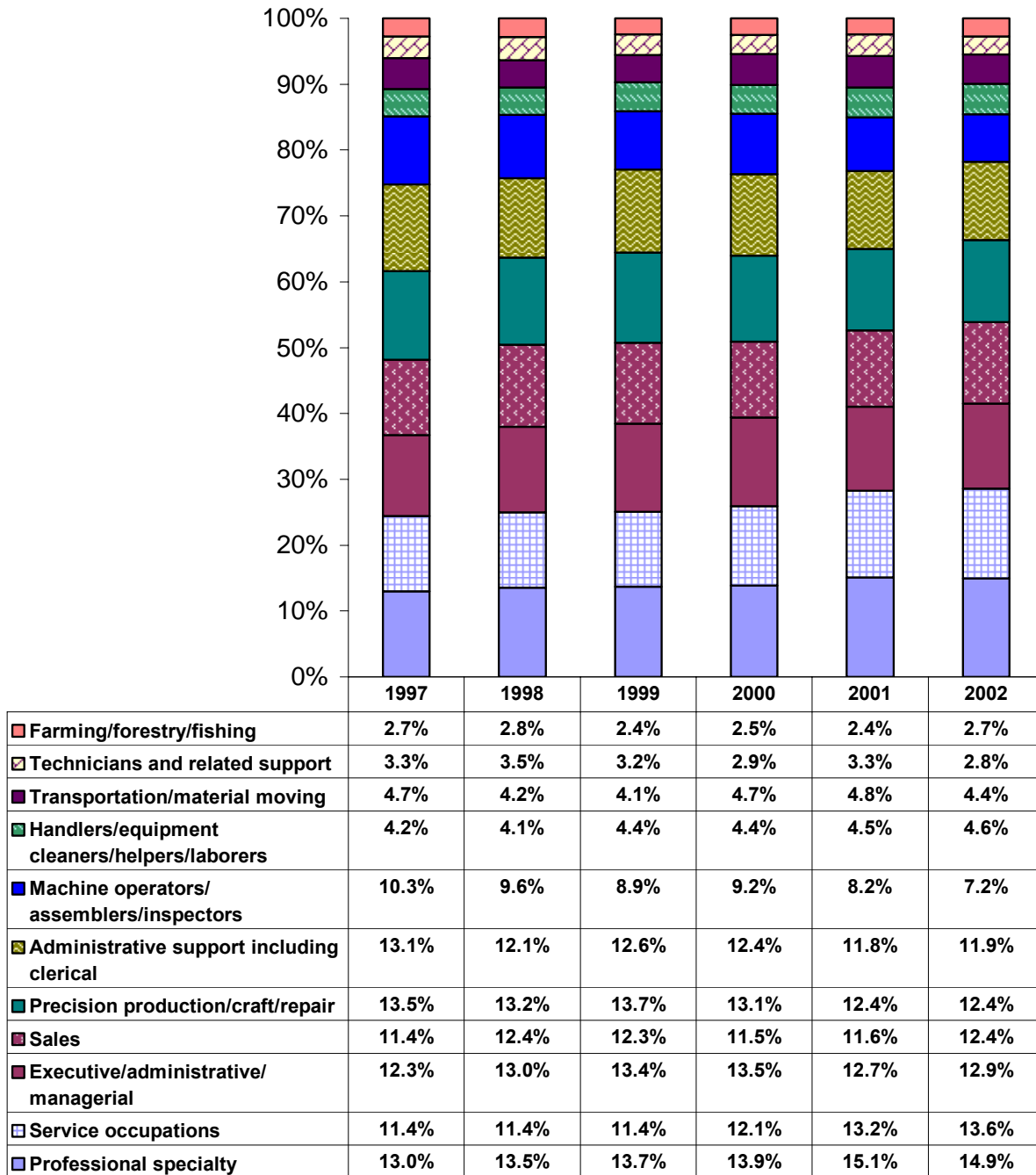
Figure 5: Percentage of North Carolina Civilian Employment by Industry: 1997 - 2002



	1997	1998	1999	2000	2001	2002
■ Agriculture	2.7%	3.0%	2.3%	2.6%	2.5%	2.9%
■ Transportation/communications/public utilities	5.4%	4.8%	4.1%	4.7%	4.7%	4.5%
■ Finance/insurance/real estate	4.6%	4.8%	5.2%	4.7%	5.1%	5.4%
■ Construction	5.8%	5.2%	5.9%	7.2%	6.6%	7.0%
■ Manufacturing - Durable goods	11.1%	11.1%	11.4%	10.4%	9.4%	8.1%
■ Manufacturing - Non-durable goods	12.2%	11.4%	10.4%	10.1%	9.3%	8.8%
■ Government	13.7%	13.5%	13.8%	13.3%	13.7%	14.1%
■ Trade	18.7%	18.6%	18.7%	18.8%	19.3%	19.6%
■ Services	18.6%	20.7%	20.5%	20.8%	22.4%	23.1%

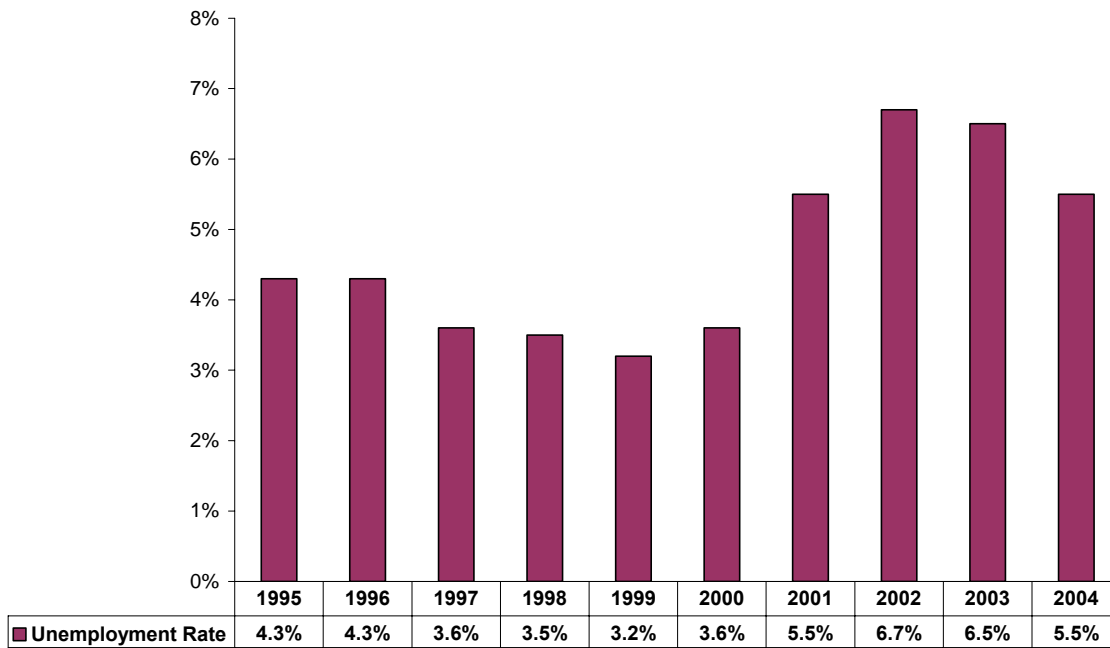
DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

Figure 6: Percentage of North Carolina Civilian Employment by Occupation: 1997 - 2002



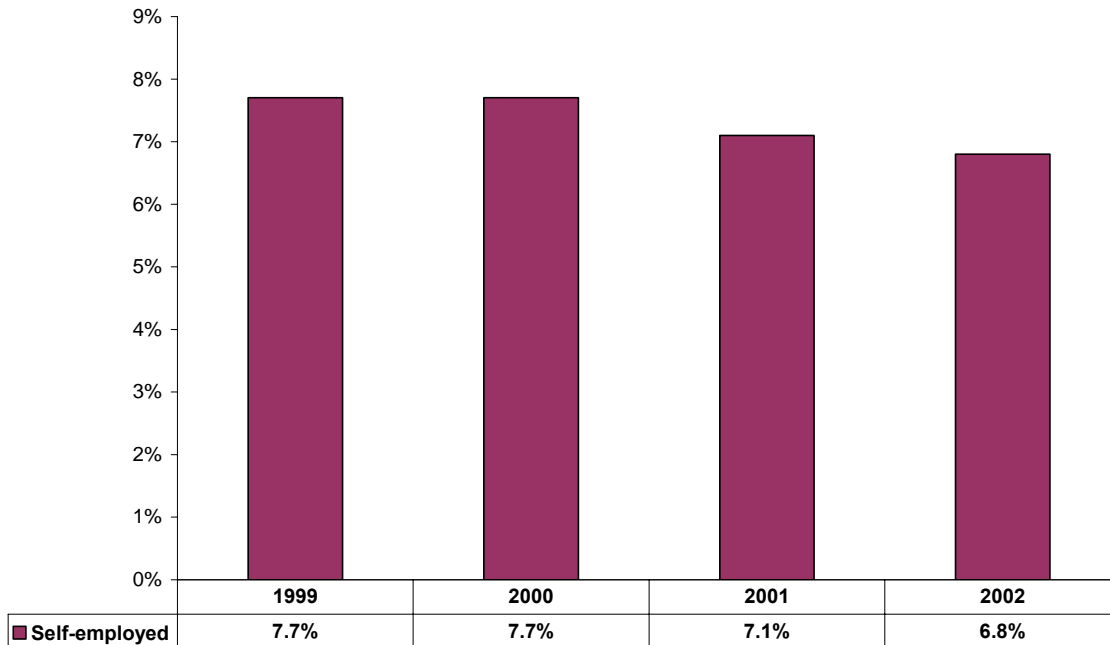
DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

**Figure 7: Percentage of North Carolina Civilian Workforce Unemployed:
1995 - 2004**



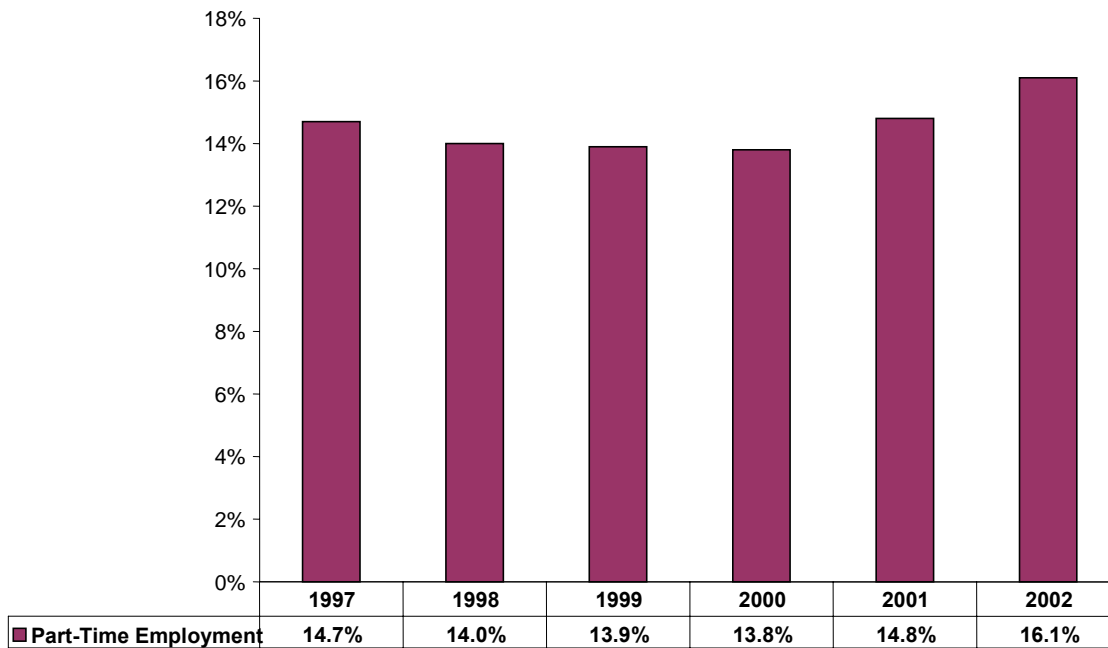
DATA SOURCE: NC State Agency Data: Department of Commerce.

**Figure 8: Percentage of North Carolina Workforce Self-employed:
1999 - 2002**



DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

Figure 9: Percentage of North Carolina Civilian Employment in Part-Time Jobs: 1997 - 2002



DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

Figure 10: Percentage of North Carolina Civilian Employment by Hours Worked: 1999 - 2002



DATA SOURCE: Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment.

ECONOMIC COSTS OF INJURIES AND ILLNESSES

The best indicator we have of the economic costs of illnesses and injuries comes from information on workers' compensation. This program provides guaranteed compensation for workers with work-related injuries or illnesses while limiting the liability exposure of employers. Workers' compensation provides benefits to partially replace lost wages and pay for medical expenses associated with a work-related injury or illness. In case of a death, the worker's dependents are eligible for survivor benefits.

In North Carolina, any employer who employs three or more employees is required to provide workers' compensation. Any employer who employs one or more persons in activities which involve the use of or presence of radiation is required to have coverage. Many of the state agriculture operations are exempt; however, an agricultural operation must carry coverage when there are ten or more regular, non-seasonal employees. In 2002, North Carolina had 38,949 hired workers on farms with less than 10 workers and 58,189 hired workers on farms with 10 workers or more. [2002 Census of Agriculture]

The average charges per workers' compensation claim filed for inpatient hospitalizations rose from \$9,249 in 1995 to \$24,691 in 2004 (a 167% increase).

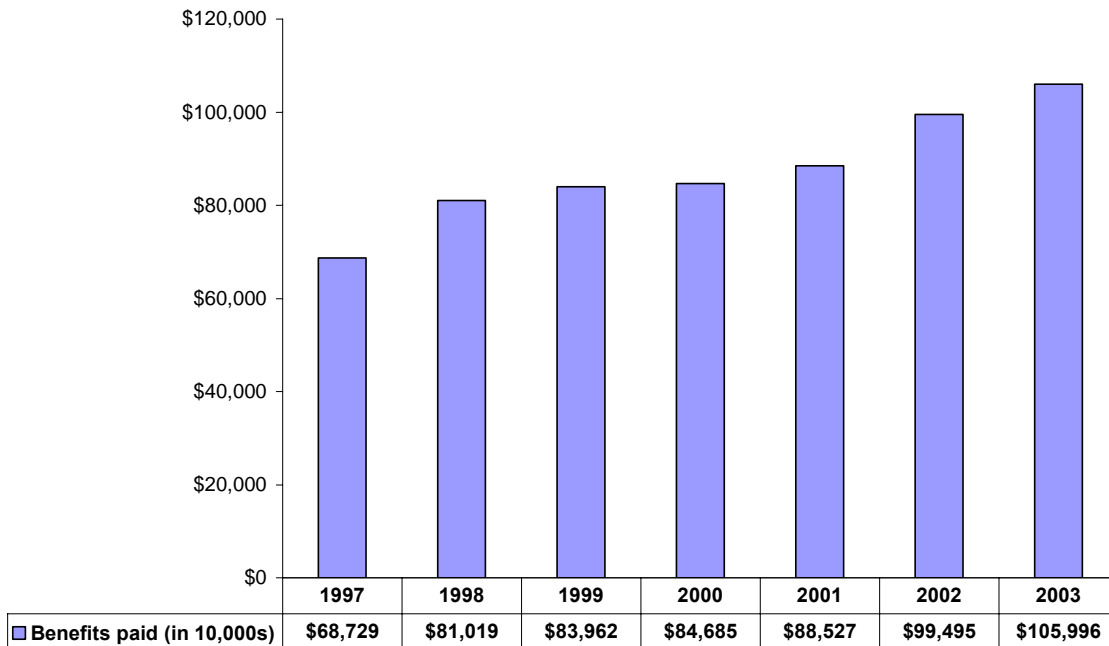
The figures on the following page provide information on the rising costs of workers' compensation benefits. Total workers' compensation benefits paid to workers in North Carolina rose from \$687,291,000 in 1997 to \$1,059,955,000 in 2003 (a 54% increase). [See Figure 11.] The average amount paid per covered worker went from \$197 to \$296. (All workers in

the state who are eligible for compensation should they sustain a work-related injury or illness are considered "covered" workers. So, this average amount is the amount paid per worker eligible for compensation, not the average amount paid per claim.)

As seen in Figure 12, the total charges filed with workers' compensation for inpatient hospital costs rose from \$51,906,556 in 1995 to \$98,616,886 in 2004 (an 89% increase). The average charges per claim filed rose from \$9,249 in 1995 to \$24,691 in 2004 (a 167% increase). The good news is that the *number* of inpatient claims decreased from 5,612 in 1995 to 3,994 in 2004 (a 29% decrease).

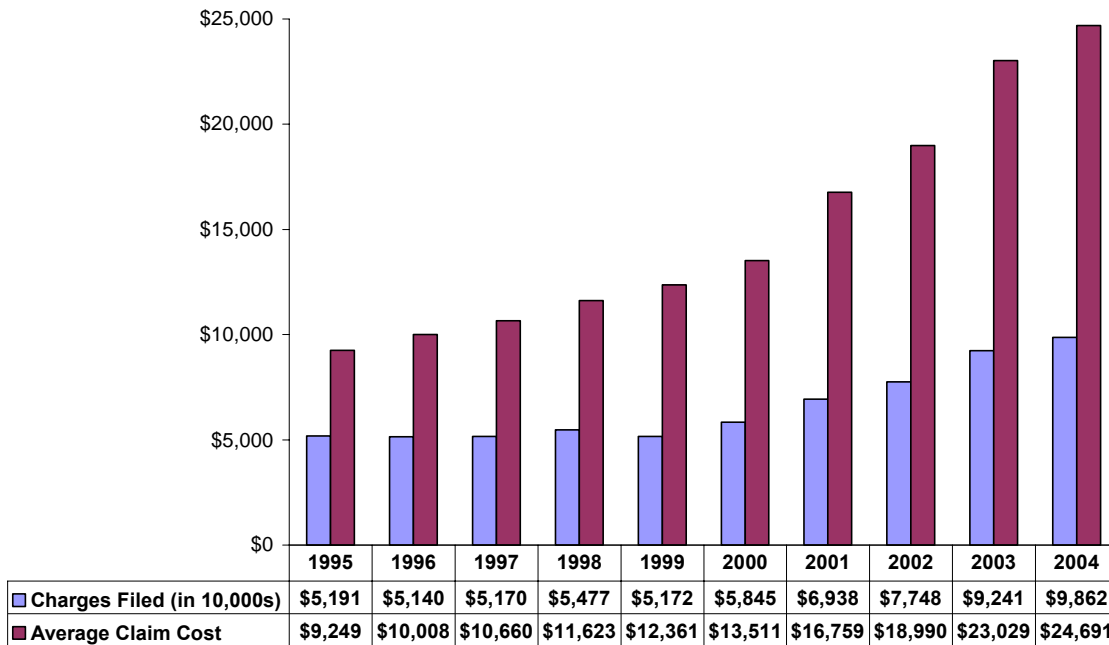
While the amount of benefits paid is an indicator of the direct financial cost of work-related injuries and illnesses, it does not reflect the total burden of these injuries. Some workers who are eligible for benefits do not file. There are indirect costs to the employer, such as productivity loss, rehiring, retraining, and overtime for loss of work. Indirect costs to employees include reduced income, depletion of savings, loss of home, and loss of physical functioning.

Figure 11: Total Amount of Workers' Compensation Benefits Paid in North Carolina: 1997 - 2003



DATA SOURCE: National Academy of Social Insurance, Total amount and average benefits paid.

Figure 12: Total Workers' Compensation Claims Filed and Average Cost per Claim for In-Patient Hospitalizations in North Carolina: 1995 - 2004



DATA SOURCE: NC Hospital Discharge Database provided by NC State Center for Health Statistics. 2004 data is provisional data.

FATAL WORK-RELATED INJURIES

A fatal work-related injury is an injury occurring at work that results in death. The Census of Fatal Occupational Injuries is the major source for fatal work-related injuries. In North Carolina, this is a collaborative data system between the U.S. Bureau of Labor Statistics (BLS) and North Carolina Department of Labor. Multiple data sources are used to provide complete counts of all of these fatalities. Both non-intentional (e.g., falls, electrocutions, motor vehicle accidents) and intentional injuries (homicides, suicides) occurring at work are included. The overall fatal occupational injury rate in North Carolina went from 6.2 per 100,000 workers in 1994 to 4.7 in 2004. [See Figure 13.]

Of the 183 fatalities in 2004, 53 were from the construction industry, 27 from transportation and warehousing, and 20 from manufacturing. There were 47 fatalities in the transportation and material moving occupations, 43 fatalities in the construction and extraction occupations, and 19 fatalities in sales and related occupations.

While there has been an overall drop in rates over time, the industries with the highest fatality rates are construction; transportation/public utilities; and agriculture, forestry, and fishing. Construction fatality rates decreased from 22.7 per 100,000 workers in 1993 to 12.4 in 2003. [See Figure 14.] For transportation/public utilities, the fatality rate was 21 in 1993 and dropped to 9.2 in 2003, with the highest rate (22.3) found in 2000. [See Figure 15.] The rate for agriculture, forestry, and fishing has dropped significantly – the 1993 rate was 66 and dropped to 24.7 by 2003. The highest rates (84) were in 1997/1998. [See Figure 16.] It should be noted that the Standard Industrial Classification (SIC) system, the traditional governmental

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industrial coding system, has been replaced by the North American Industrial Classification System (NAICS). This change took place for BLS reporting in 2003. This change in the coding system has the potential to impact the data for industrial fatality rates because there are different categories in the two systems, making comparisons difficult.

Fatality rates not only vary by industry and occupation but also by age, gender, and race/ethnicity. No deaths under age 16 are

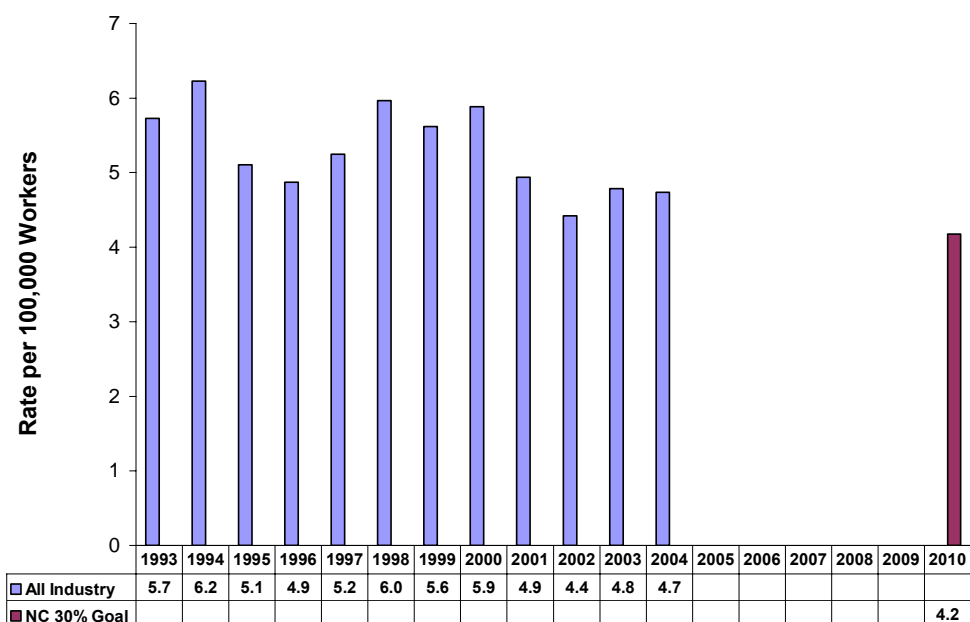
reported by NC CFOI for 1992 through 2004. A total of seven deaths for ages 16 and 17 were reported for years 1992 through 2002. Six of those were in 1992 and 1993. The death rate for persons 65 and older is higher than for other ages. However, it dropped from 16.8 in 1995 to 9.3 in 2003. [See Figure 17.] The highest rate for those 65 and older was in 1998 (27.6), and the lowest rate was in 2001 (6.7). Males have a much higher fatality rate than females. The male fatality rate between 1997 and 2002 ranged from a high of 10.8 in 2000 to a low of 7.7 in 2002. The female fatality rate for this same period ranged from a high of 1.1 in 1998 to a low of 0.55 in 2002. [See Figure 18.] When comparing blacks to whites, blacks had the lowest fatality rate during the period from 1995 to 2003. (Because of the small numbers of persons that fall into the "Other" race category, the rates for that group tend to be rather erratic.) [See Figure 19.] The rate for Hispanics from 1997 to 2003 ranged from a high in 1997 of 17.8 to a low of 7.4 in 2003. [See Figure 20.] For this same time period (1995 to 2003), Hispanics had a higher fatality rate than non-Hispanics.

From 2000 to 2004, transportation (accidents) was the largest single source of fatalities; this was followed by contact with objects/equipment. [See Figure 21.]

Goals for Occupational Health and Safety in North Carolina:

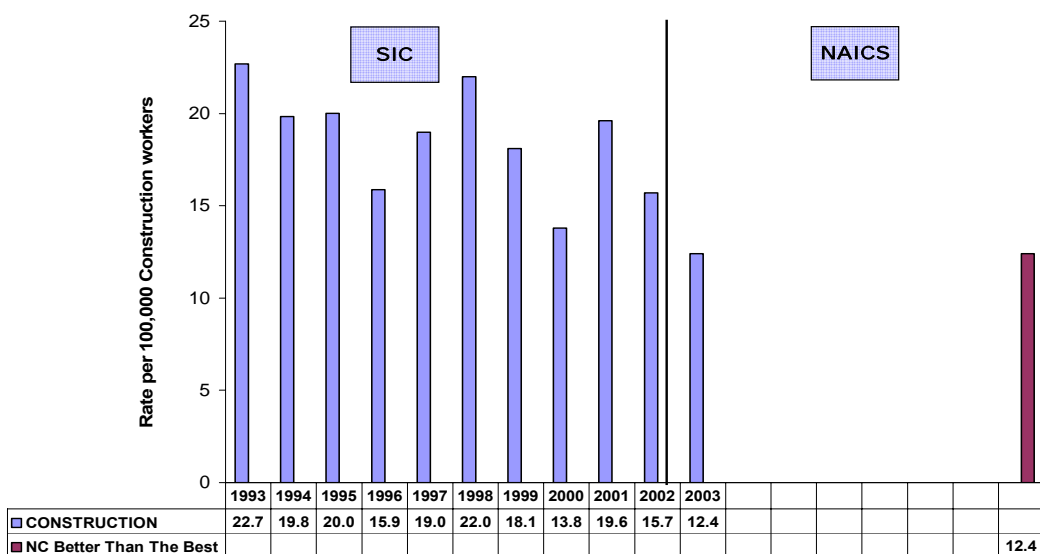
The Occupational Health Surveillance Unit, using an adaptation of the Healthy People 2010, has developed goals for reducing the levels of fatality rates for construction; transportation; and agriculture, forestry, and fishing. These are reflected on the graphs for those industries [Figures 13 - 16] with a red bar for the year 2010. For more information on how these goals were determined, please refer to Appendix A (A Note About Healthy People 2010.)

Figure 13: Rate of Fatal Injuries For Workers in North Carolina: 1993 - 2004



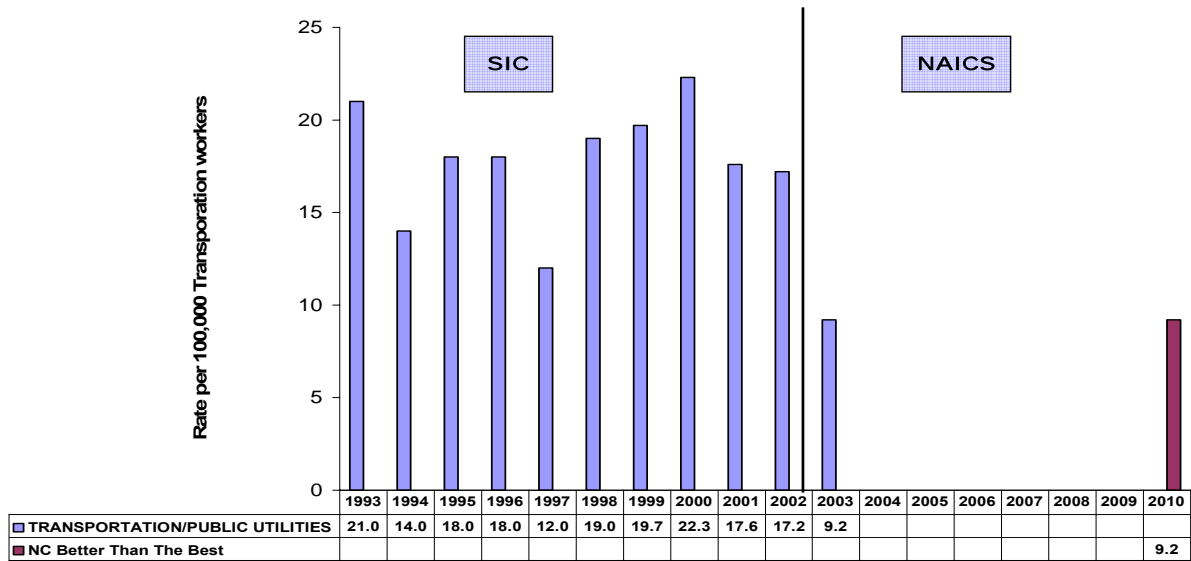
DATA SOURCES: Number of fatalities: Census of Fatal Occupational Injuries. Employment Statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.
 NC 30% goal is calculated as 30% improvement over the 1998 rate.

Figure 14: Rate of Fatal Injuries For Construction Workers in North Carolina: 1993 - 2003



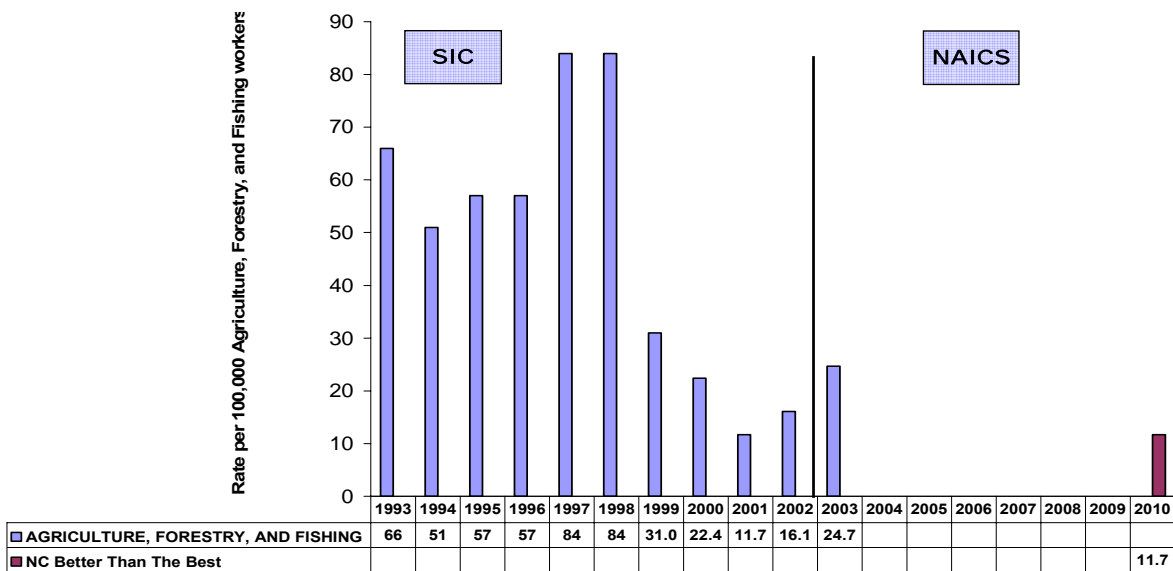
DATA SOURCES: Number of fatalities: Census of Fatal Occupational Injuries. Employment Statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.
 SIC: Standard Industrial Classification.
 NAICS: North American Industrial Classification System.
 NC Better Than The Best is Calculated based on the lowest rate (the 2003 rate).

Figure 15: Rate of Fatal Injuries For Transportation Workers in North Carolina: 1993 - 2003



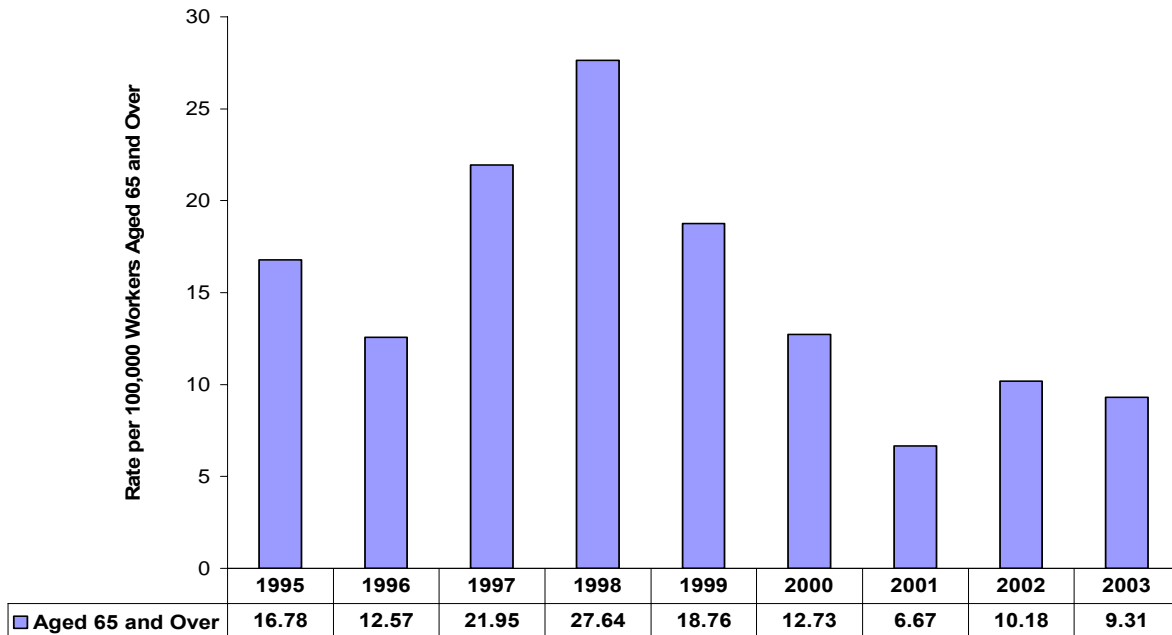
DATA SOURCES: Number of fatalities: Census of Fatal Occupational Injuries. Employment Statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.
 SIC: Standard Industrial Classification.
 NAICS: North American Industrial Classification System.
 NC Best-To-Date is Calculated based on the lowest rate (the 2003 rate).

Figure 16: Rate of Fatal Illnesses and Injuries For Agriculture, Forestry, and Fishing Workers in North Carolina: 1993 - 2003



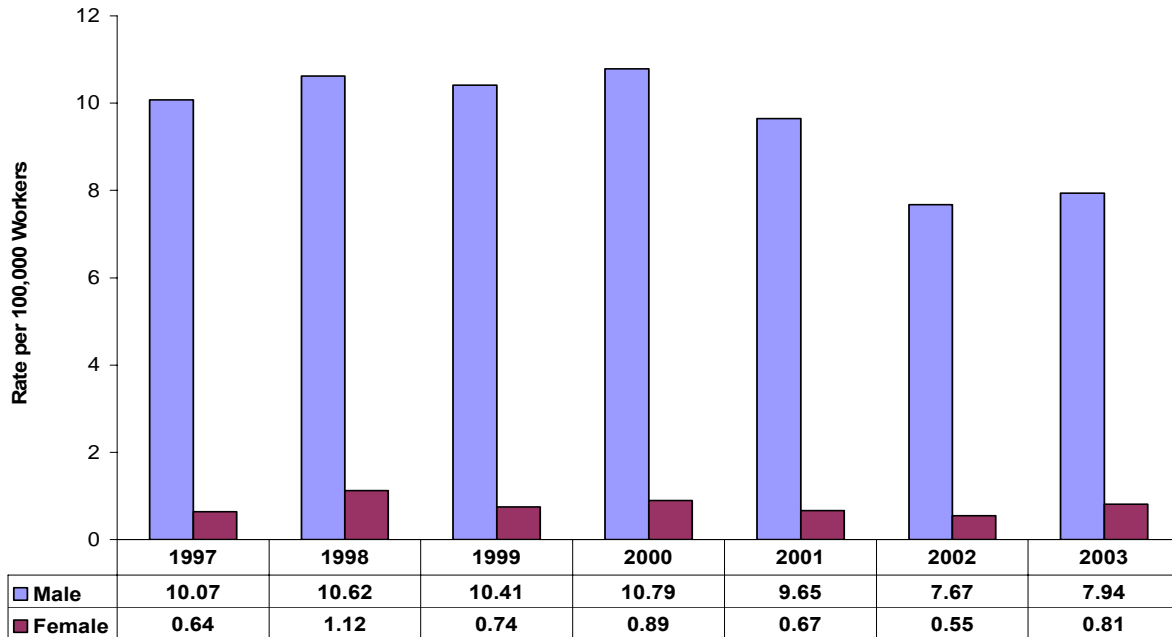
DATA SOURCES: Number of fatalities: Census of Fatal Occupational Injuries. Employment Statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.
 SIC: Standard Industrial Classification.
 NAICS: North American Industrial Classification System.
 NC Best-To-Date is Calculated based on the lowest rate (the 2003 rate).

Figure 17: Rate of Fatal Injuries For Workers Aged 65 and Over in North Carolina: 1995 - 2003



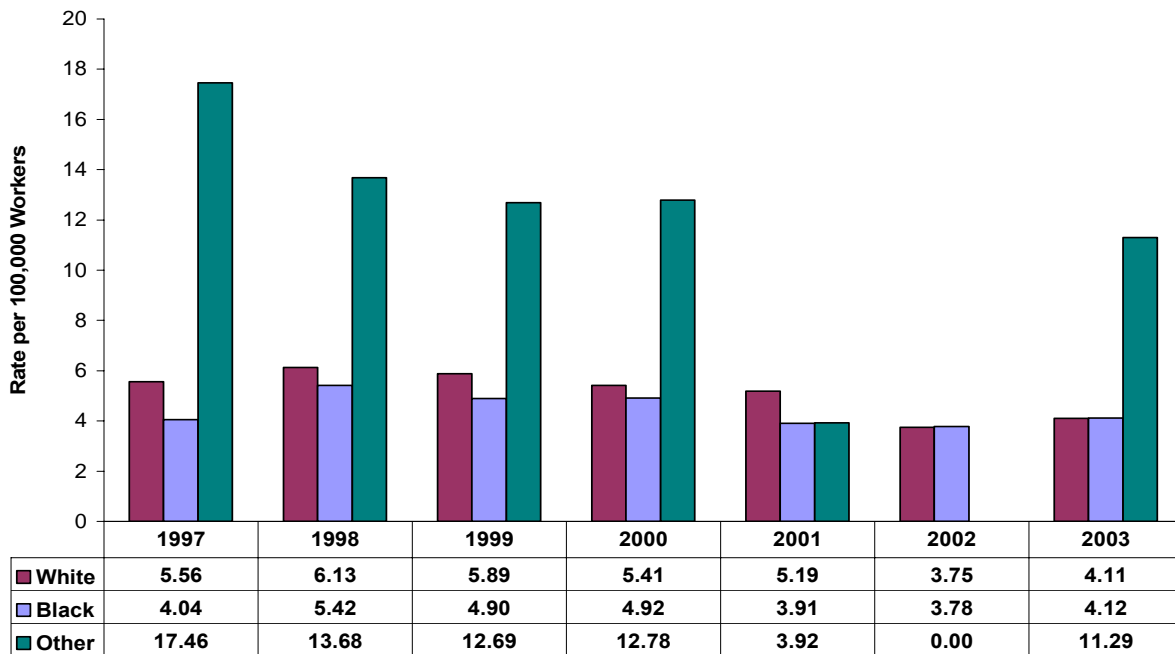
DATA SOURCE: Number of fatalities: Census of Fatal Occupational Injuries. Employment statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

Figure 18: Rate of Fatal Injuries by Worker Gender in North Carolina: 1995 - 2003



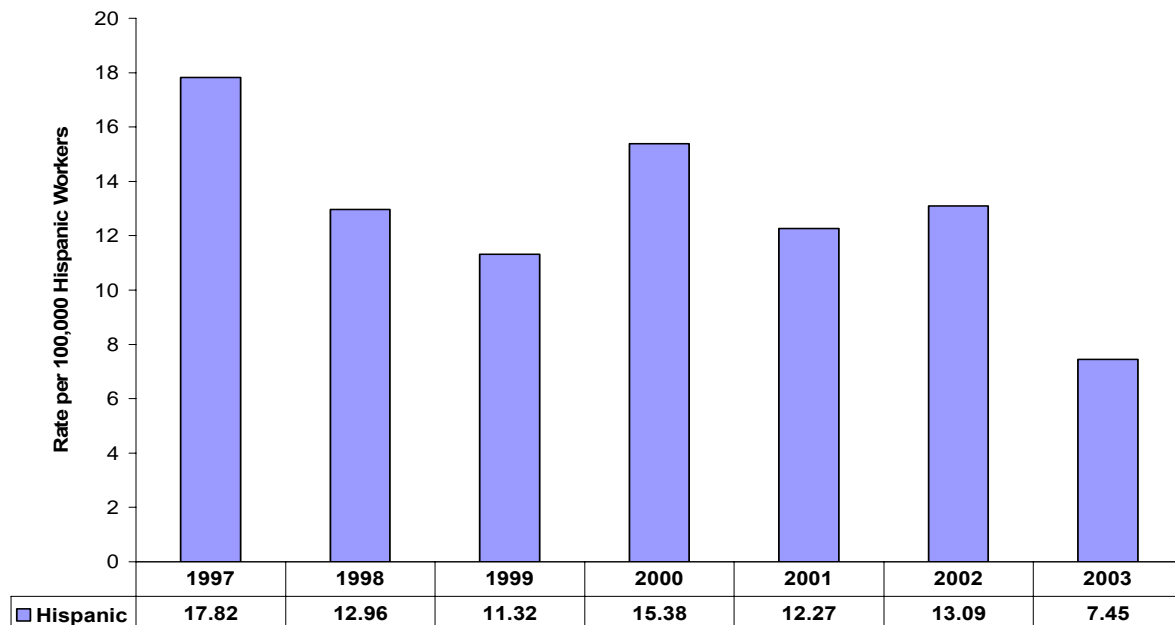
DATA SOURCE: Number of fatalities: Census of Fatal Occupational Injuries. Employment statistics used to calculate rates: U.S. BLS Geographic Profiles of Employment and Unemployment.

Figure 19: Rate of Fatal Injuries by Worker Race in North Carolina: 1995 - 2003



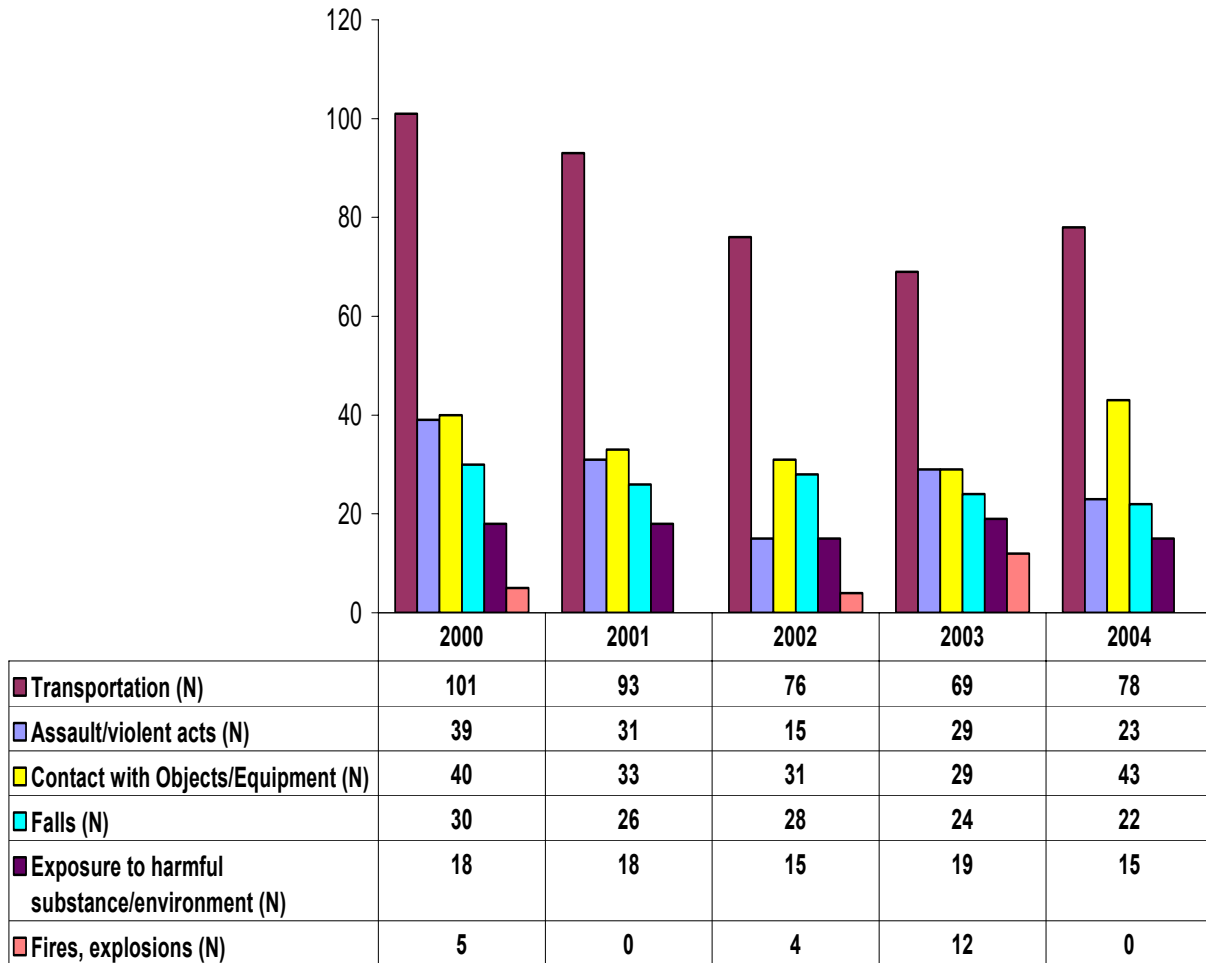
DATA SOURCE: Number of fatalities: Census of Fatal Occupational Injuries. Employment statistics used to calculate rates: U.S. BLS Geographic Profiles of Employment and Unemployment.
 Note: The rate for "Other" races is quite variable due to the small number of persons in that category.

Figure 20: Rate of Fatal Injuries by Worker Ethnicity in North Carolina: 1995 - 2003



DATA SOURCE: Number of fatalities: Census of Fatal Occupational Injuries. Employment statistics used to calculate rates: U.S. BLS Geographic Profiles of Employment and Unemployment.

Figure 21: Number of Fatal Injuries by Source of Injury in North Carolina: 2000 - 2004



DATA SOURCE: Census of Fatal Occupational Injuries Profiles. U.S. Department of Labor, Bureau of Labor Statistics.

NON-FATAL WORK-RELATED INJURIES AND ILLNESSES

Work-related injuries are those injuries that occur at work as a result of events such as falls, being struck or crushed by objects, electrical shocks, or assaults. Work-related illnesses (e.g., elevated blood lead levels, pneumoconiosis, malignant mesothelioma, skin diseases, etc.) are more likely to be the results of long-term exposure to hazardous chemicals or repeated stresses/strains at work. Because injuries (e.g., burns, amputations, assaults, etc.) are usually the result of a single event, they are less difficult to track than illnesses.

The North Carolina Department of Labor, working with the U.S. Bureau of Labor Statistics (BLS), collects information on occupational injuries and illnesses. The purpose is to determine incidence rates and case and demographic data for occupational injuries and illnesses. There are issues of underreporting. One reason for is that the BLS data does not include all workplaces (for example, small businesses, self-employed workers, and many agricultural workers are not usually included). Another issue is the lack of consistent reporting by both employees and employers.

Of the 130,100 recordable cases reported in 2004, 82% were from the private sector and 18% were from state and local government. Within the private sector, 29% were from manufacturing, 14% were from retail trade, and 12% were from health care and social assistance. Within the

While there was some improvement in the private health services (from a high of 6.9 in 2000 to a low of 4.1 in 2004) and in the local government health services (from a high of 9.2 in 2002 to a low of 6.2 in 2004), the rates continued to rise for state government health services (from a low of 9.4 in 2000 to a high of 15.8 in 2004).

public sector, 35% were from education services, 27% were from health care and social assistance and 25% were from public administration.

Overall, the non-fatal occupational injury rate in North Carolina changed from 6.8 per 100 FTE workers in 1984 (with a high of 8.2 in 1992) to a low of 4.2 for 2002 through 2004. [See Figure 22.] While the overall injury and illness rate has declined, differences are

found when looking at rates by specific industries or by age, gender, race and ethnicity. While many of these rates indicate of improvement, others indicate increases in injury and illness rates. The same is true when looking at specific injuries and illnesses. Some of the specific rates are provided in this report.

Figures 23 - 28 show trends for North Carolina for the major industry categories of construction; health services industry; agriculture, forestry, and fishing; transportation; mining; and manufacturing. The rate for the construction industry has improved greatly, from a high of 13.5 in 1985/1986 to a low of 4.4 in 2003/2004. Most other industries improved somewhat over that time period – agriculture from a high of 11.3 in 1992 to a low of 3.7 in 2003 (2004 rate was 6.7); transportation from a high of 8.9 in 1990 to a low of 4.7 in 2002 (2004 rate was 6.6); mining from a high of 7.3 in 1989 to a low of 2.5 in 2002 and 2004; and manufacturing from a high of 10.5 in 1988 to a low of 5.1 in 2003 (2004 rate was 5.3). The industry that is of most concern in North Carolina is the health care industry. While there was some improvement in private health services (from a high of 6.9 in 2000 to a low of 4.1 in 2004) and in local government health services (from a high of 9.2 in 2002 to a low of 6.2 in 2004), the rates continued to rise for state government health services (from a low of 9.4 in 2000 to a high of 15.8 in 2004). It should be noted that the Standard Industrial Classification (SIC) system, the traditional governmental

industrial coding system, has been replaced by the North American Industrial Classification System (NAICS). This change took place for BLS reporting in 2003. Therefore data reported since 2003 is not directly comparable to pre-2003 data.

Rates differ by age groups -- adolescent and older worker rates are lower than those for the overall worker population. While lower than the overall worker population, the rates for adolescents dropped from a high of 1.2 in 1995 to a low of 0.35 in 2001 but *climbed back* to 0.92 for 2003. The rates for those over 65 remained fairly stable between 1995 (0.47) and 2004 (0.48). The highest rate during that time period was 1999 (0.61). [See Figure 29.]

Injury rates vary considerably by gender and race/ethnicity. Females have traditionally had lower rates than men. When compared by industry, the female rates are higher for the education and health services industries and for the leisure and hospitality industries but lower for all other industries. [See Figure 30.] When comparing race/ethnicity by industry, Hispanics have the highest rates for all industries where information is available for them. When comparing blacks and whites, whites have the highest rates for natural resources and mining, financial services, and the leisure and hospitality industry. Blacks have the highest rates for all other industries. [See Figure 31.]

Selected Occupational Illnesses:

The North Carolina Division of Public Health conducts adult blood lead surveillance for the state (ABLES). Rates for blood lead levels greater than or equal to 25 $\mu\text{l/dl}$ per 100,000 employed workers in North Carolina decreased from 5.81 in 1998 to 2.17 in 2004. [See Figure 32.] Rates

The North Carolina Division of Public Health conducts adult blood lead surveillance for the state (ABLES). Rates for blood lead levels greater than or equal to 25 $\mu\text{l/dl}$ per 100,000 employed workers in North Carolina decreased from 5.81 in 1998 to 2.17 in 2004.

of occupational pesti-cide poisonings reported to the state poison control center remained fairly constant from 2000 to 2004 - the highest rate (2.11) occurred in 2002 and the lowest rate (1.11) was in 2001. [See Figure 33.] A look at age-standardized rates of hospitalizations for pneumoconiosis indicates that the rates are moving toward an upward trend (from 1995 to 2003 the rates went from 95.8 to 127 per 1,000,000

residents). For asbestosis-specific cases, the rates went from 51.2 to 93.7. [See Figure 34.] Age-standardized incidence rate of malignant mesothelioma increased from 1995 to 2003, from a rate of 8.7 to 12.5 per million residents. The lowest incidence rate was in 2000 (7.5 per million residents). [See Figure 35.] Rates of occupational skin diseases/disorders decreased between 1995 and 2003, from a rate of 70 per 100,000 workers to 32. [See Figure 36.]

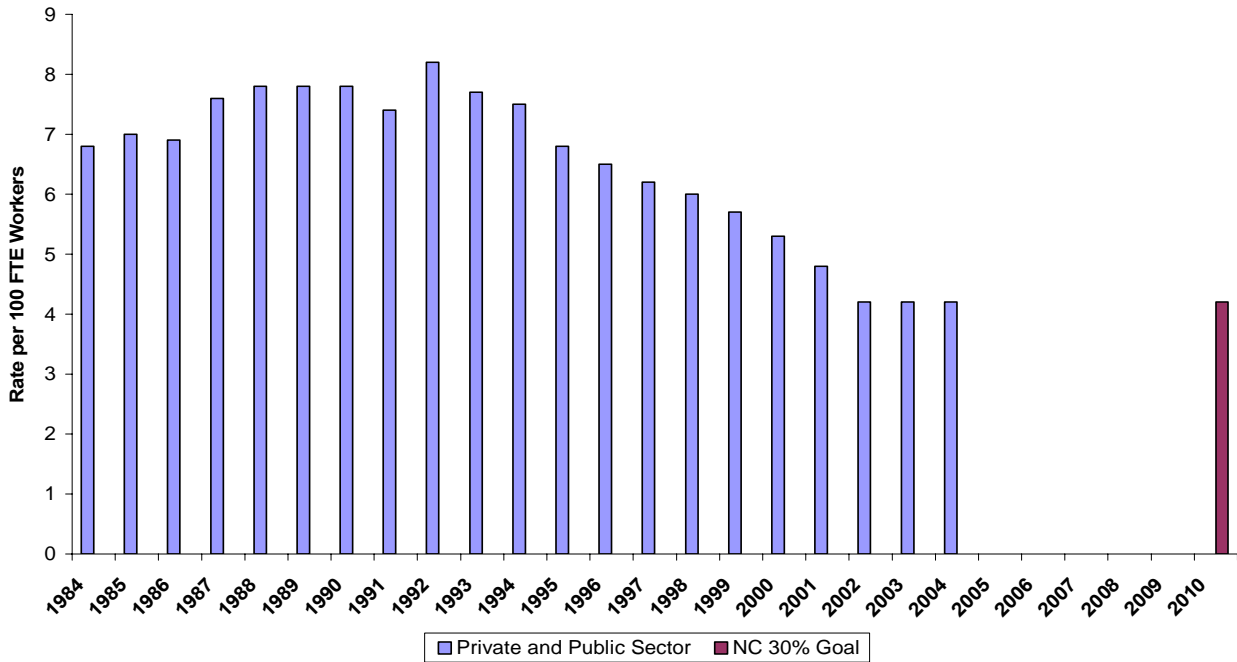
Selected Occupational Injuries:

From 1998 to 2003, work-related assaults increased from 1.0 (per 100,000 workers) to 2.0. While these rates were higher in earlier years, this increase for more recent years is a concern. [See Figure 37.] Overexertion and repetitive motion injury rates have decreased, from 814 per 100,000 employees in 1992 to 289 per 100,000 employees in 2003. [See Figure 38.] Rates for work-related burns in North Carolina have decreased (from a high in 1996 of 4.0 to a low in 2003 of 2.0 hospitalizations per 100,000 employed persons). [See Figure 39.] While the rate for work-related amputations is lower for 2003 than for 1995, the rate appears to be rising since around 1999 (with the exception of 2001). [See Figure 41.] Work-related musculoskeletal disorders with days away from work decreased from 2000 to 2002, from 400 to 322 per 100,000 FTE workers. [See Figure 40.]

Goals for Occupational Health and Safety in North Carolina:

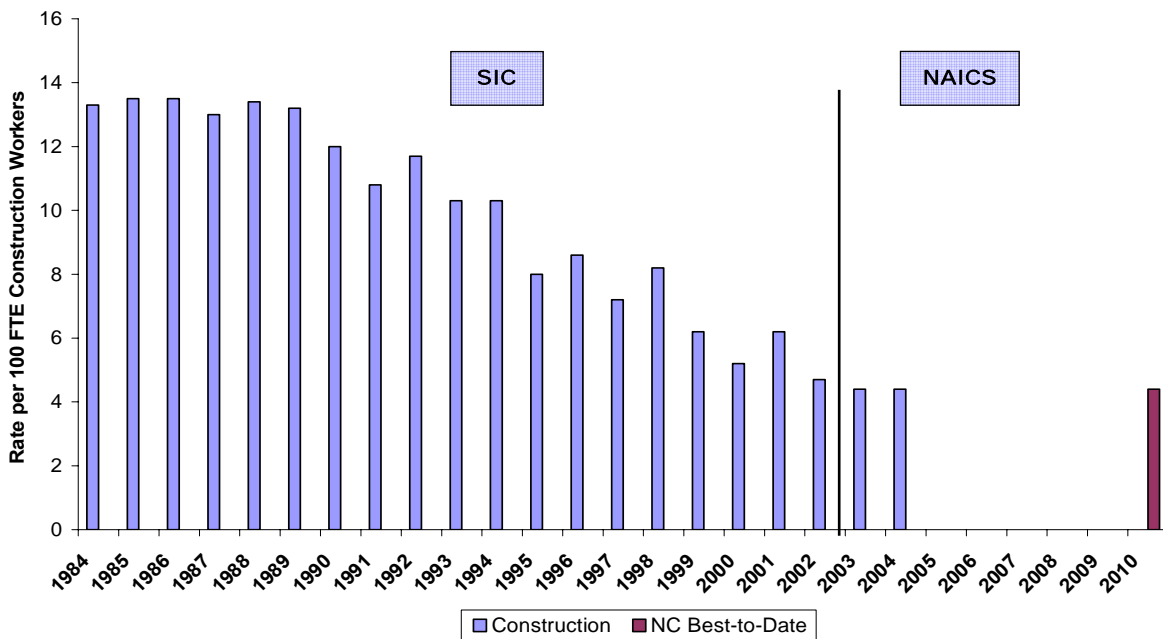
The Occupational Health Surveillance Unit, using an adaptation of the Healthy People 2010, has developed a goal for reducing the overall level of non-fatal illness and injury rates. Additionally, goals have been set for rates in the following industries: construction; health services (by private, state, and local sectors); agriculture, forestry, and fishing; transportation; mining; and manufacturing. Other goals are for reducing rates for adolescents and older workers, and for the following specific conditions: overexertion/repetitive motion, pneumoconiosis, assaults, elevated blood lead levels, and skin diseases. These are reflected on the graphs [Figures 22 - 28, 32, 33, 35-37] with a red bar for the year 2010. For more information on how these goals were determined, please refer to Appendix A: *A Note about Healthy People 2010*.

Figure 22: Rate of Non-Fatal Illnesses and Injuries in North Carolina: 1984 - 2004



DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics. NC 30% goal is calculated as 30% improvement over the 1998 rate.

Figure 23: Rate of Non-Fatal Injuries and Illnesses in Construction Industry in North Carolina: 1984 - 2004



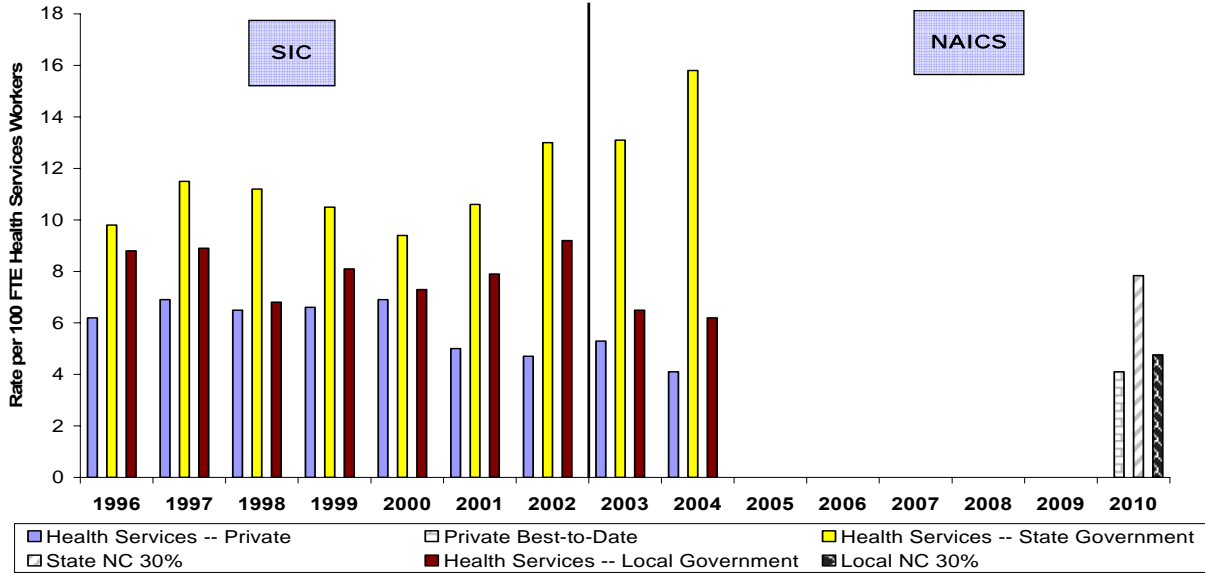
DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

SIC: Standard Industrial Classification.

NAICS: North American Industrial Classification System.

NC Best-to-Date is calculated as the 2003/2004 rate.

Figure 24: Rate of Non-Fatal Injuries and Illnesses in Health Services Industry in North Carolina: 1996 - 2004



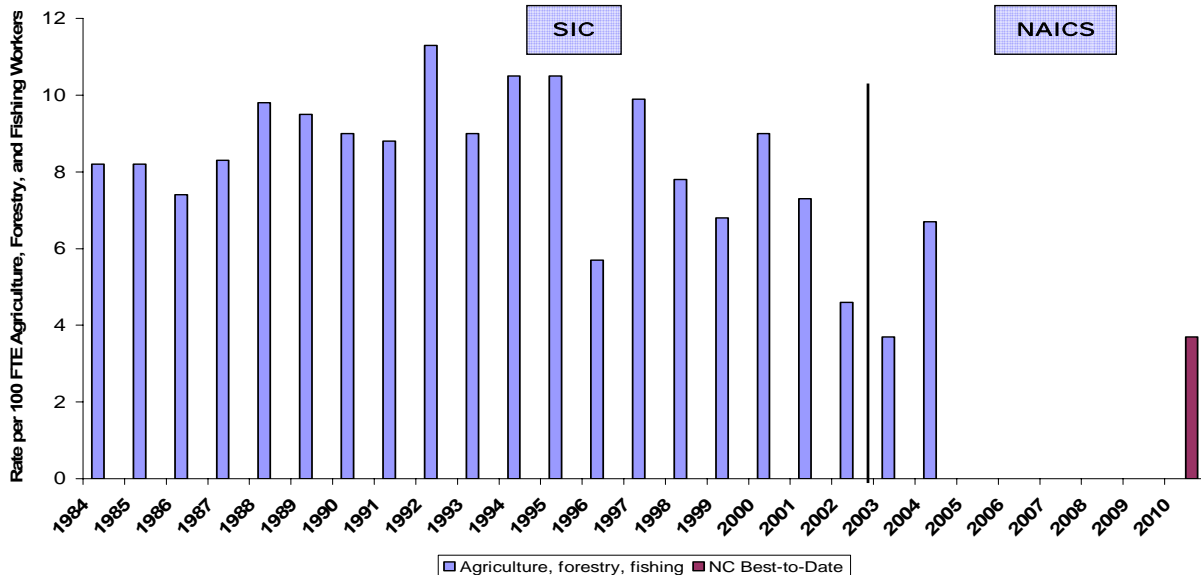
DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

SIC: Standard Industrial Classification.

NAICS: North American Industrial Classification System.

The Private Best-to-Date is calculated as the 2004 rate. The State and Local government 30% goals are calculated as 30% improvement over the 1998 rates.

Figure 25: Rate of Non-Fatal Injuries and Illnesses in Agriculture, Forestry and Fishing Industry in North Carolina: 1984 - 2004



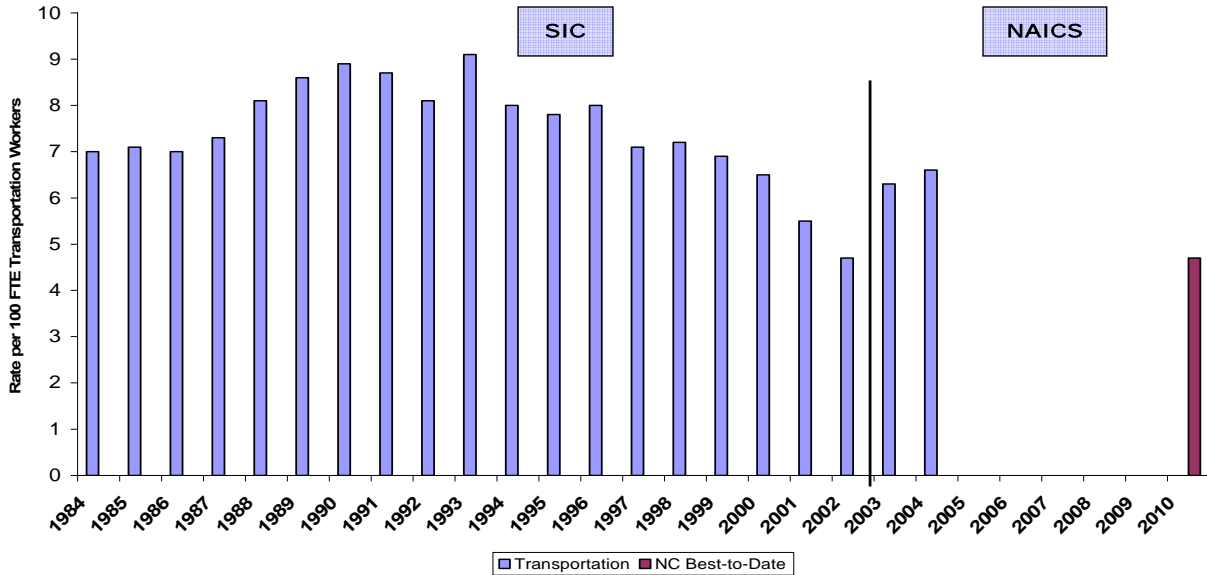
DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

SIC: Standard Industrial Classification.

NAICS: North American Industrial Classification System.

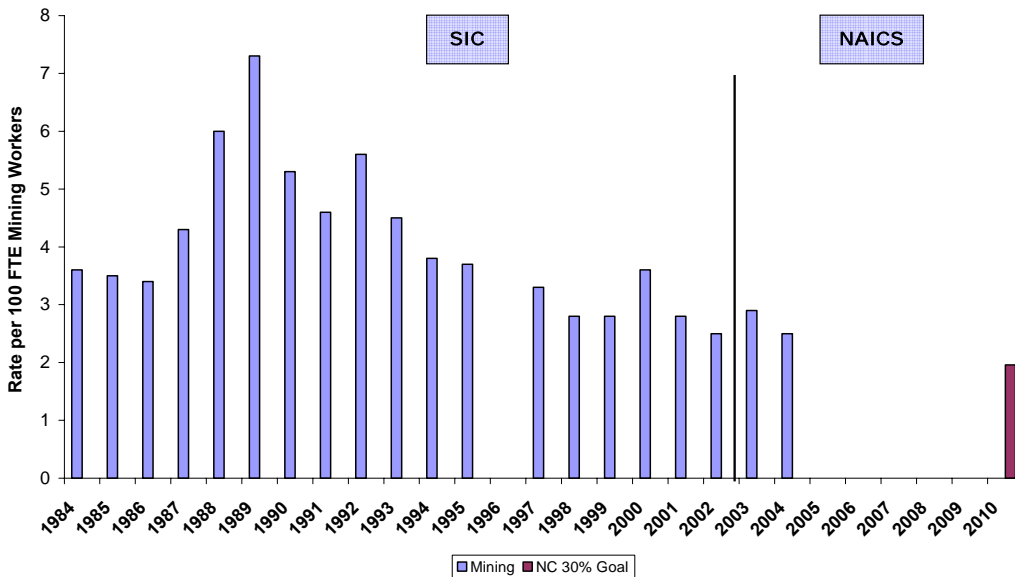
NC Best-to-Date is calculated as the 2003 rate.

Figure 26: Rate of Non-Fatal Injuries and Illnesses in Transportation Industry in North Carolina: 1984 - 2004



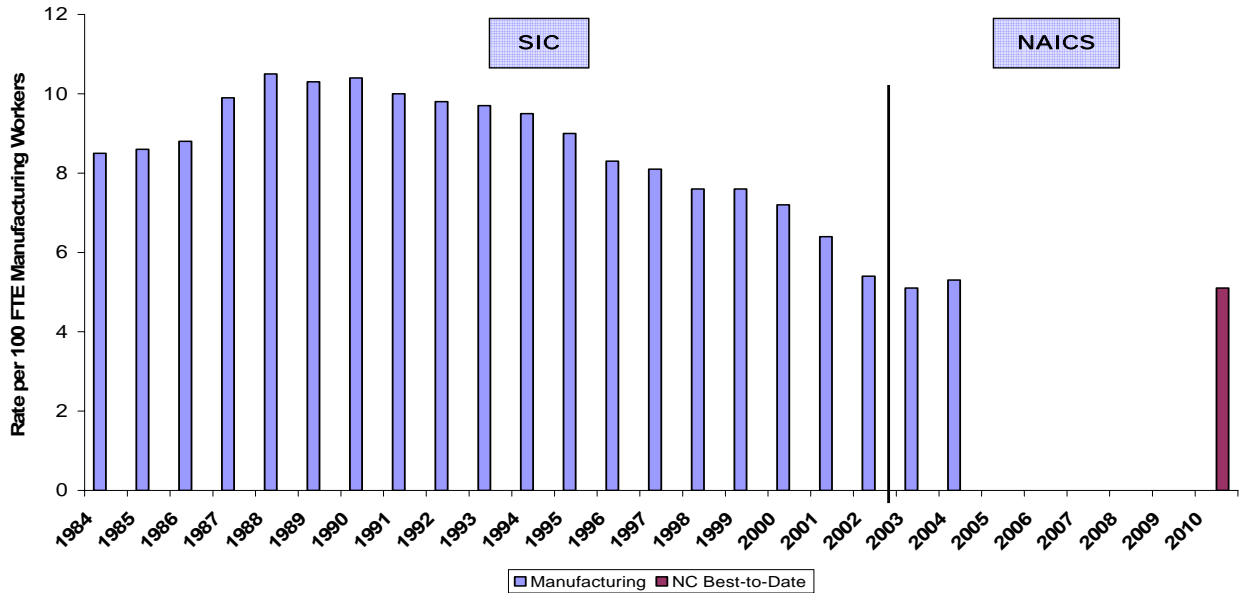
DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.
 SIC: Standard Industrial Classification.
 NAICS: North American Industrial Classification System.
 NC Best-to-Date is calculated as the 2002 rate.

Figure 27: Rate of Non-Fatal Injuries and Illnesses in Mining Industry in North Carolina: 1984 - 2004



DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.
 SIC: Standard Industrial Classification.
 NAICS: North American Industrial Classification System.
 NC 30% goal is calculated as 30% improvement over the 1998 rate.
 Note: 1996 data are not reported.

Figure 28: Rate of Non-Fatal Injuries and Illnesses in Manufacturing Industry in North Carolina: 1984 - 2004



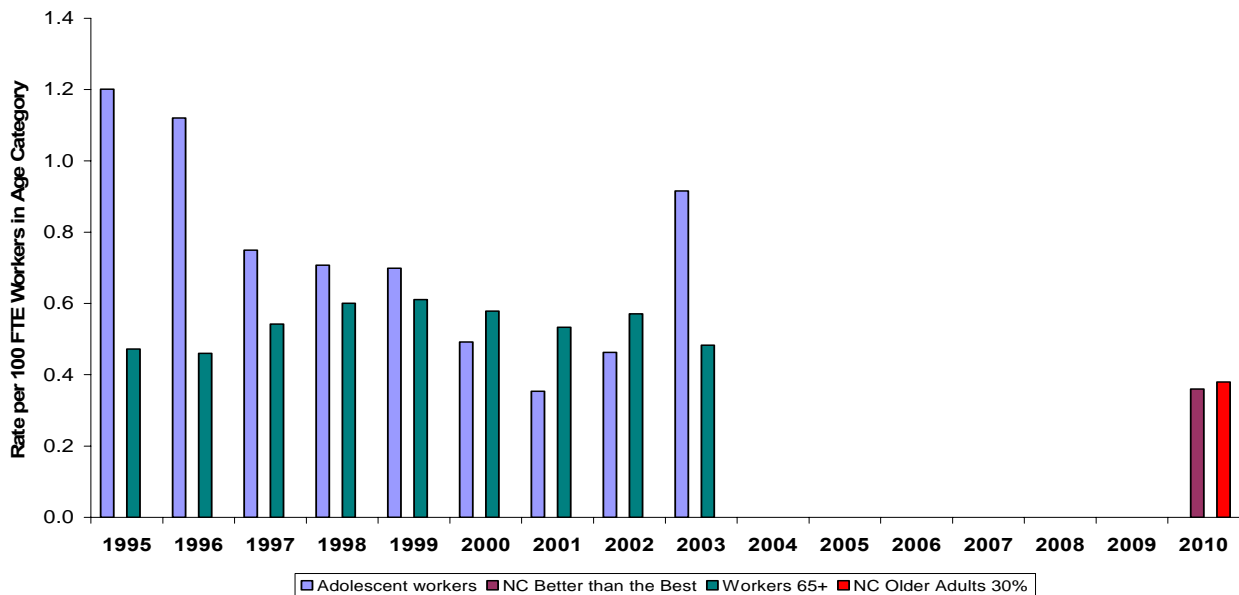
DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

SIC: Standard Industrial Classification.

NAICS: North American Industrial Classification System.

NC Best-to-Date is calculated as the 2003 rate.

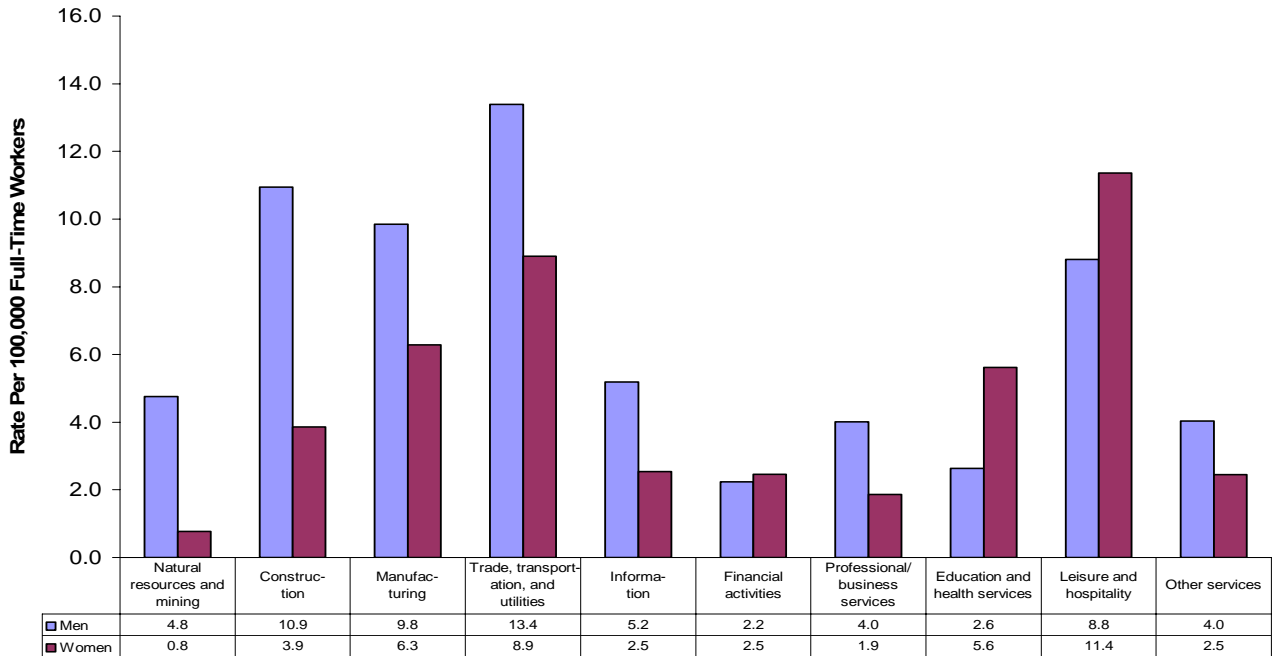
Figure 29: Rate of Non-Fatal Injuries and Illnesses for Adolescents and Older Workers in North Carolina: 1995 - 2003



DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

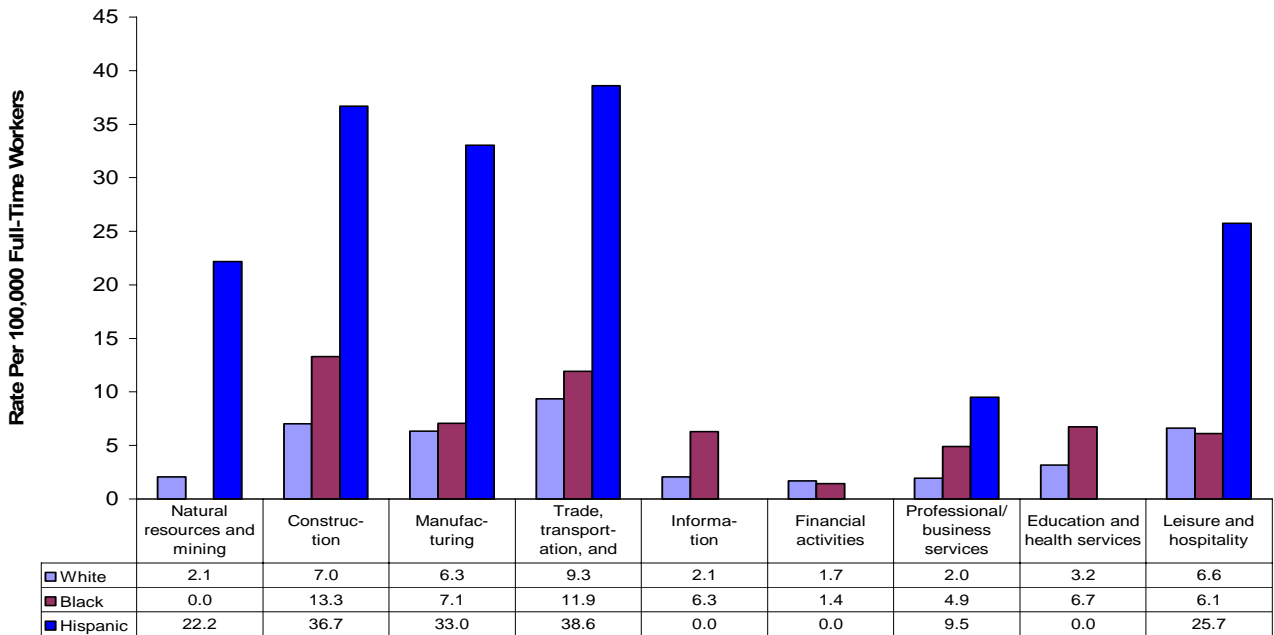
NC Best-to-Date for adolescents is the 2001 rate. The NC 30% goal for older adults is 30% improvement over the 1997 rate.

Figure 30: 2003 Injury Rates in North Carolina by Gender and Industry



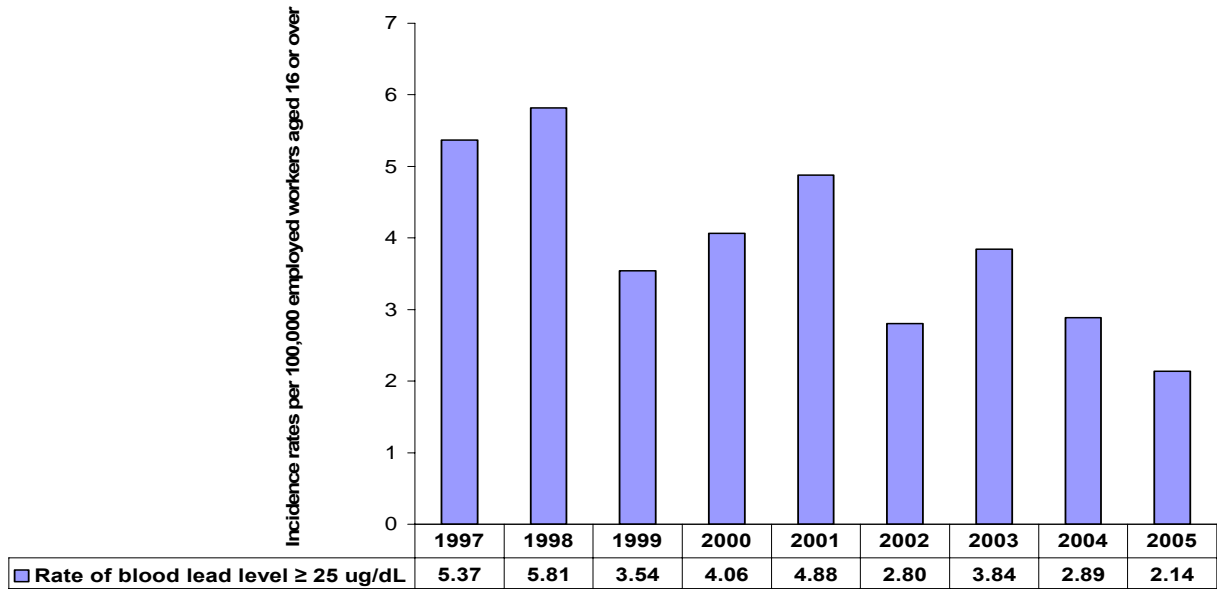
DATA SOURCE: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

Figure 31: 2003 Injury Rates in North Carolina by Race or Ethnicity and Industry



DATA SOURCE: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

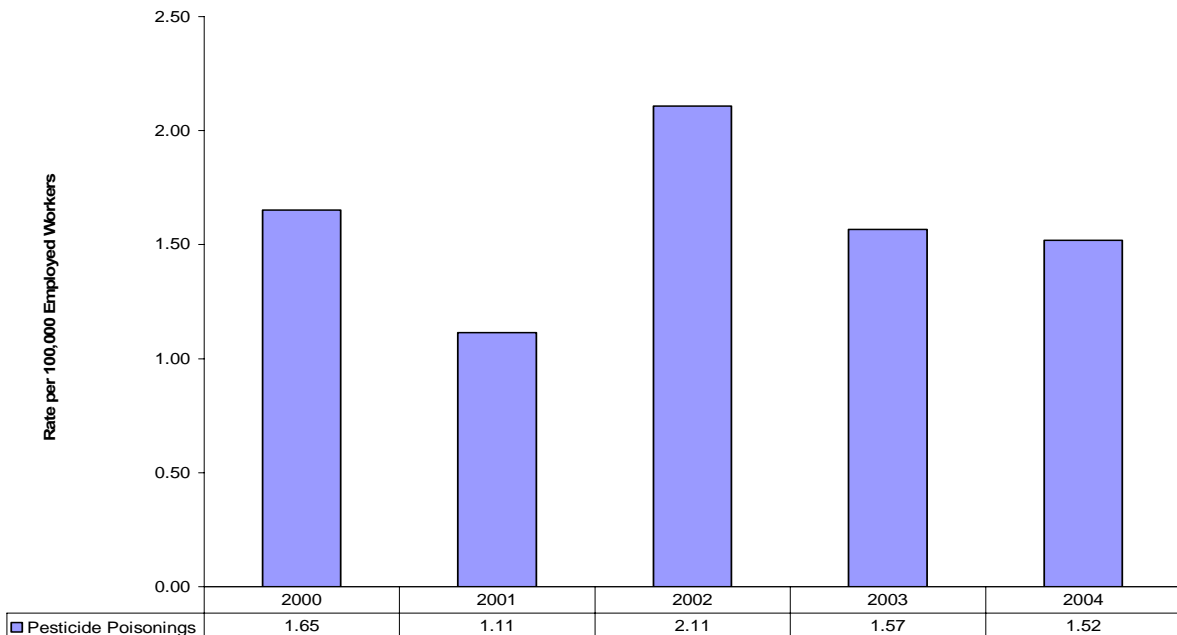
Figure 32: Incident Rates of Elevated Blood Lead Levels (BLL \geq 25 $\mu\text{g/dl}$) Among Adults in North Carolina: 1997 - 2005



DATA SOURCES: Number of cases with elevated blood lead levels: NC Adult Blood Lead Epidemiology Surveillance (ABLES) program. Employment estimates: BLS Current Population Survey. 2005 employment estimates are based on 2004 estimates.

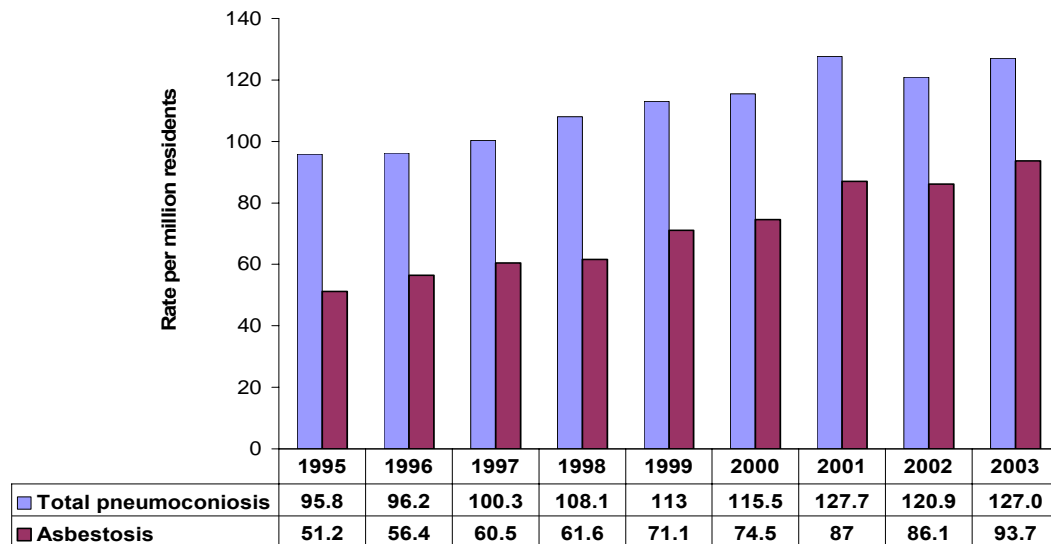
Note: Healthy People 2010 goal is to eliminate BLLs above this level.

Figure 33: Occupational Pesticide Poisonings Reported to Carolinas Poison Center: 2000 - 2004



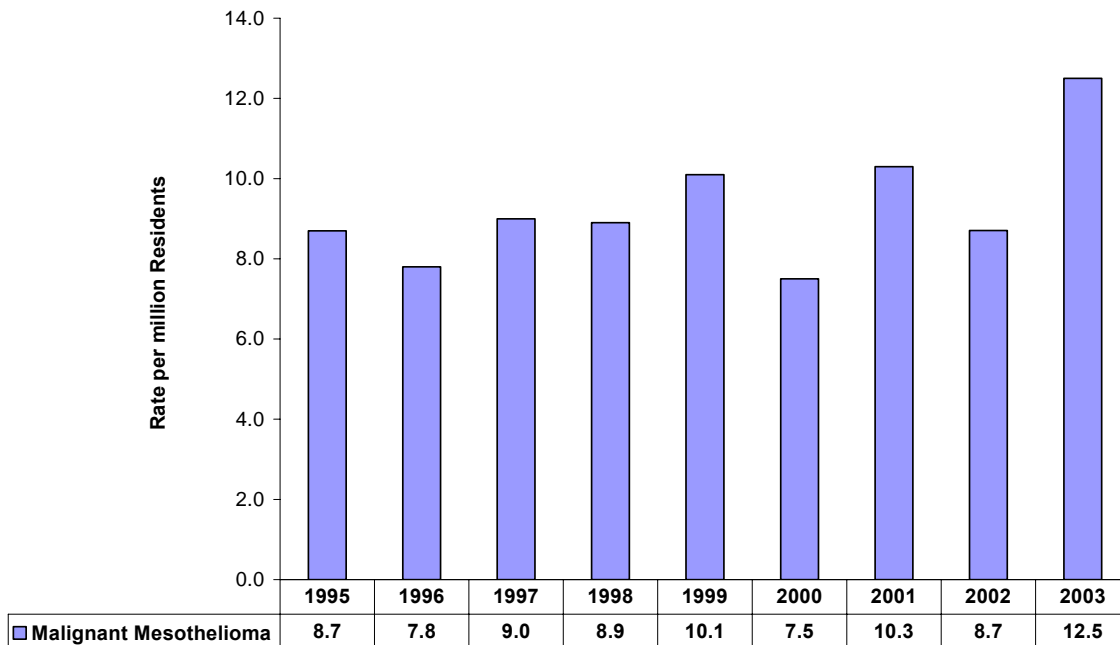
DATA SOURCE: Number of Cases: Carolina's Poison Center. Employment estimates: BLS Current Population Survey.

Figure 34: Age-Standardized Rates of Hospitalization from or with Pneumoconiosis for North Carolina: 1995 - 2003



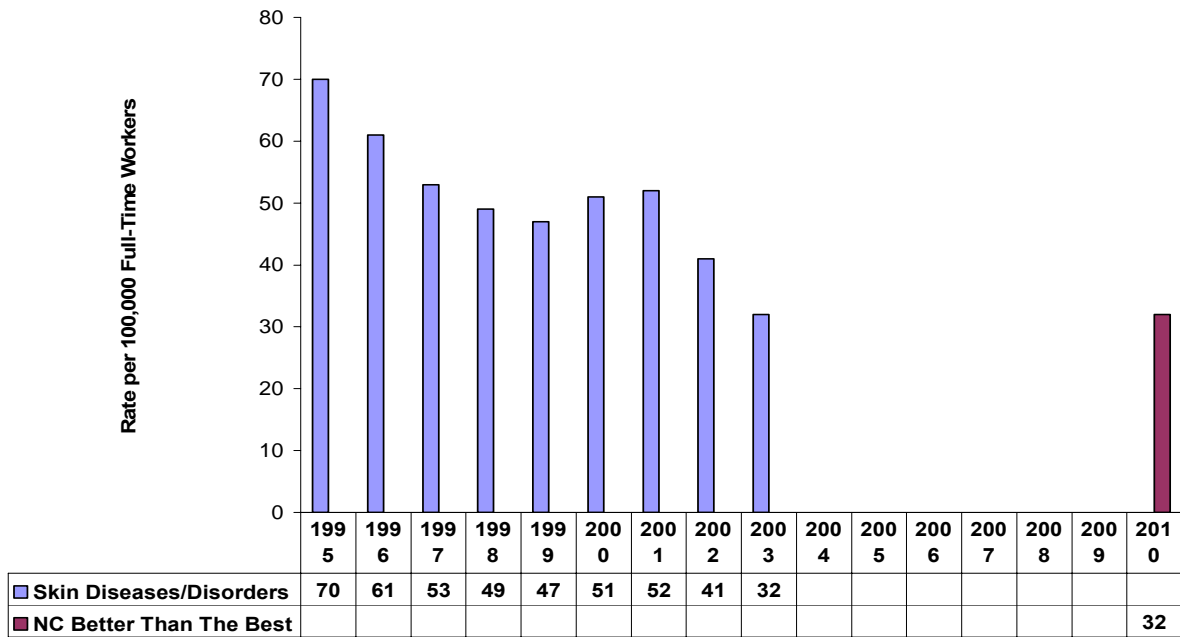
DATA SOURCE: Number of hospitalizations: NC Hospital Discharge Database, State Center for Health Statistics. Employment statistics used to calculate rates: U.S. Bureau of Labor Statistics' Current Population Survey.

Figure 35. Age-Standardized Incidence Rate of Malignant Mesothelioma in North Carolina: 1995 - 2003



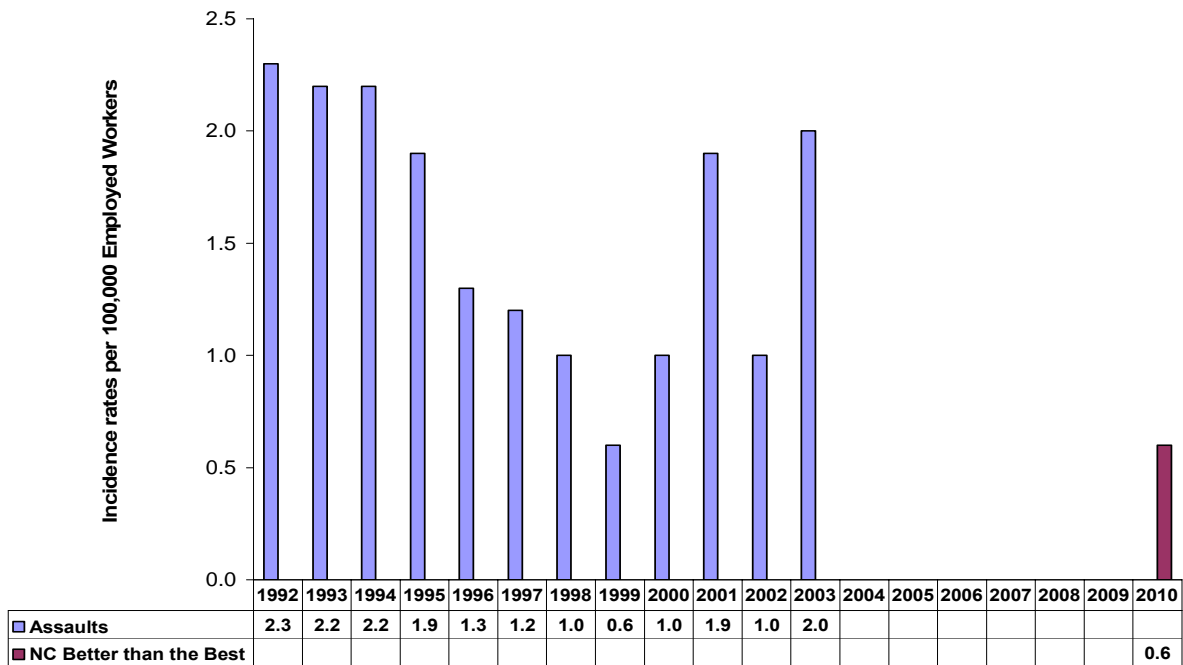
DATA SOURCES: Number of mesothelioma cases: NC Central Cancer Registry, State Center for Health Statistics. Population statistics used to calculate rates: U.S. Census Bureau.

Figure 36: Occupational Skins Diseases or Disorders Among Full-Time Workers in North Carolina: 1995 - 2003



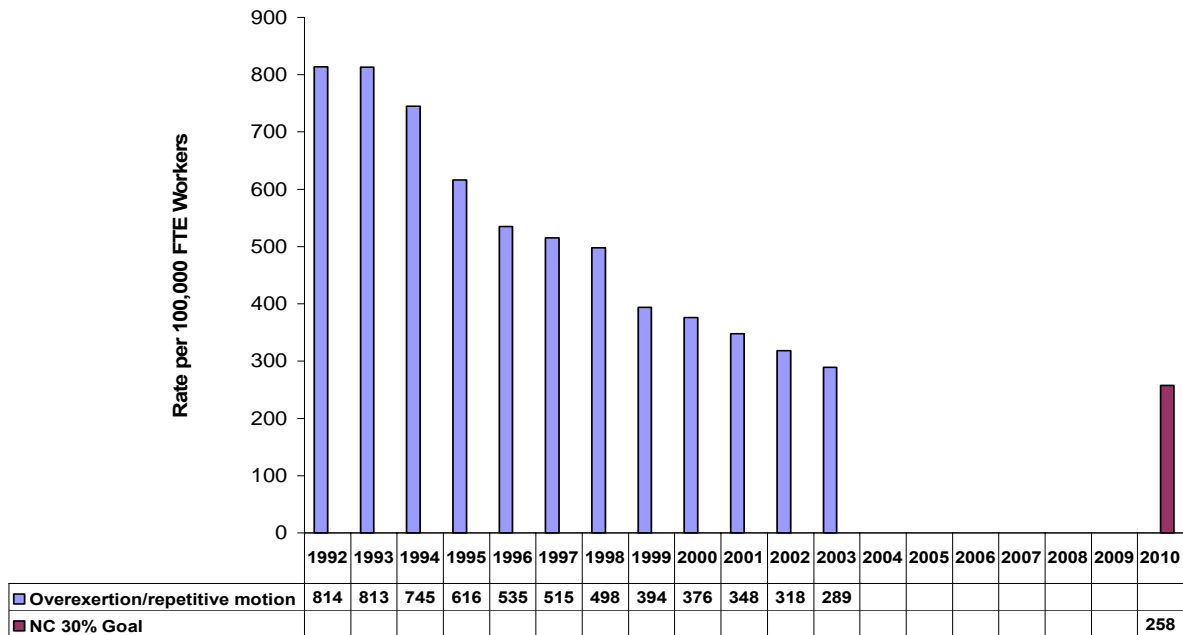
DATA SOURCE: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics. NC Best-to-Date for skin disorders is the 2003 rate.

Figure 37: Work-Related Assaults in North Carolina: 1992 - 2003



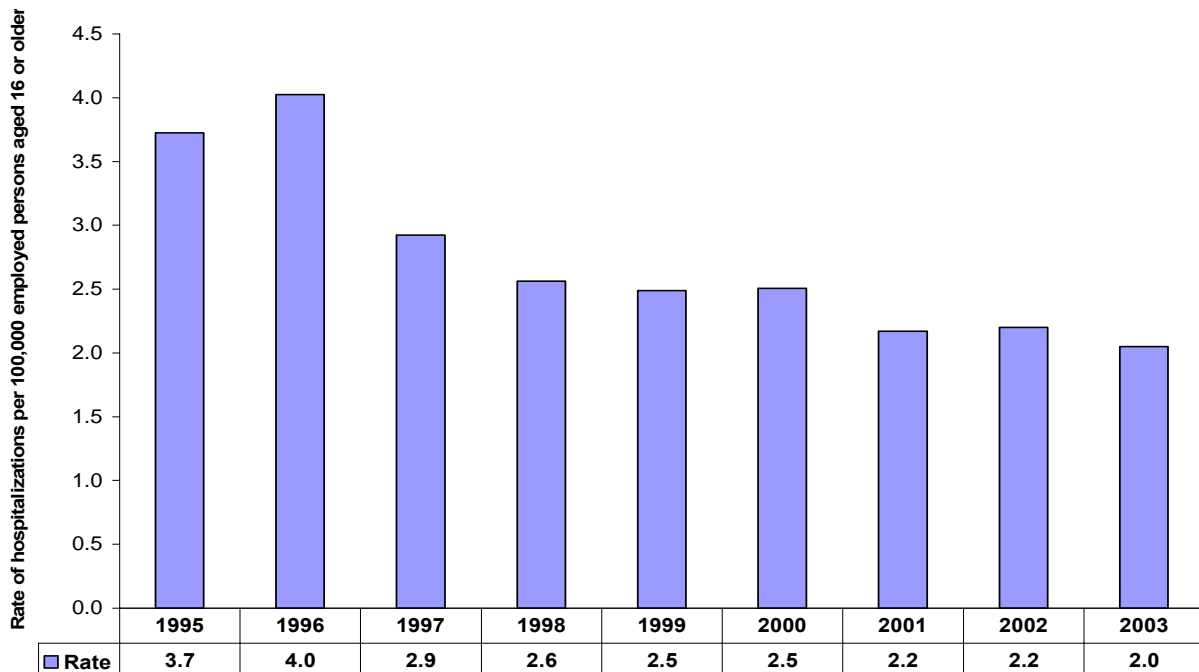
DATA SOURCE: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics. NC Best-to-Date for assaults is the 1999 rate.

Figure 38: Overexertion and Repetitive Motion Injury Rate for North Carolina: 1992 - 2003



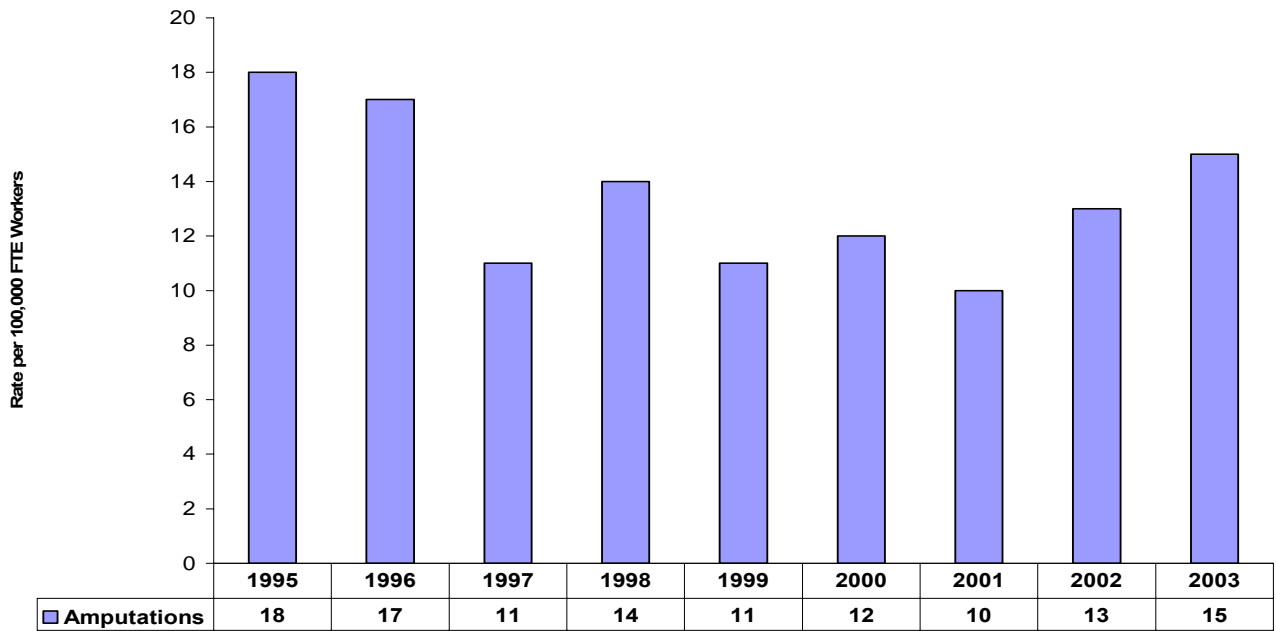
DATA SOURCES: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics. NC 30% goal is calculated as 30% improvement over the 1998 rate.

Figure 39: Rate of Hospitalizations for Work-Related Burns in NC: 1995 - 2003



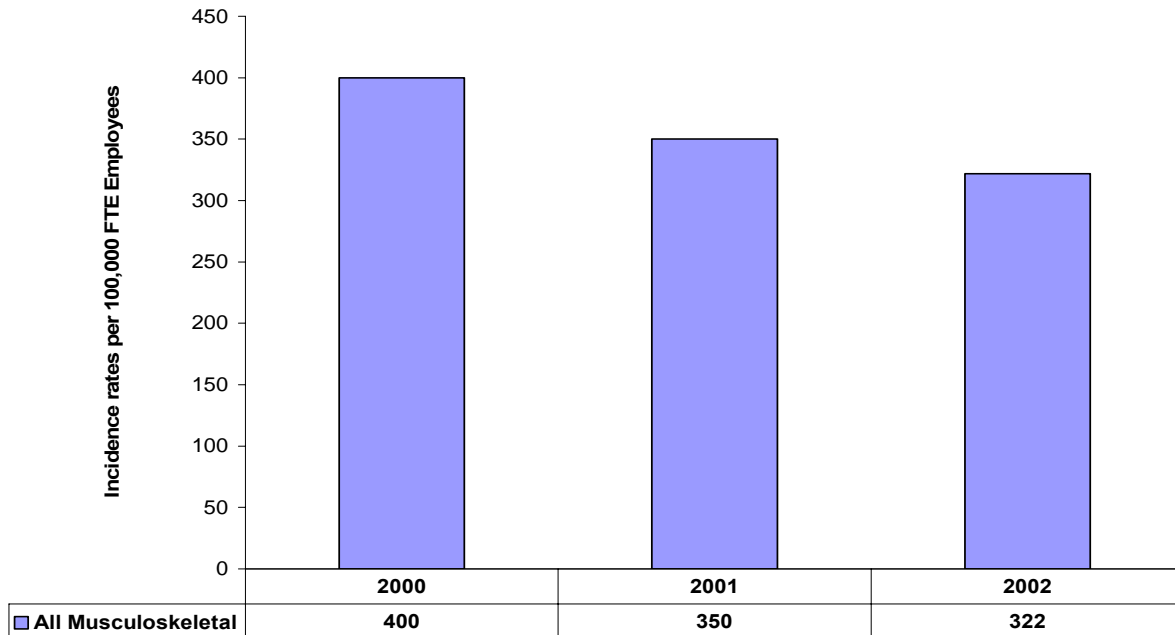
DATA SOURCE: Number of hospitalizations: NC Hospital Discharge Database, State Center for Health Statistics. Employment statistics used to calculate rates: U.S. Bureau of Labor Statistics' Current Population Survey.

Figure 40: Work-Related Amputations with Days Away From Work Reported by Private Sector Employers in North Carolina, 1995 - 2003



DATA SOURCE: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

Figure 41: Work-Related Musculoskeletal Disorders with Days Away From Work Reported by Private Sector Employers in North Carolina: 2000 - 2002



DATA SOURCE: Occupational Injuries and Illness in North Carolina, NC Department of Labor and US Department of Labor, Bureau of Labor Statistics.

INDUSTRIES AND OCCUPATIONS WITH HIGH RISK FOR OCCUPATIONAL MORBIDITY AND MORTALITY IN NORTH CAROLINA

In 1999, there were 6.3 injury and illness cases per 100 FTE workers nationally. In North Carolina, the rate was slightly lower at 5.7. In 2003, the national rate was 5.0 cases per 100 FTE workers and the comparable North Carolina rate was 4.2. There are several industries and occupations which are found, at the national level, to have higher rates of illnesses, injuries, and

There are several industries and occupations which are found to have higher rates of illnesses, injuries, and deaths than exist for the overall working population.

deaths than exist for the overall working population. The proportion of persons in North Carolina employed in these industries and occupations provides information which can help explain the injury and illness rate and the fatality rate for North Carolina.

National Requirements For Determining Industries and Occupations With High Risk for Occupational Morbidity and Mortality .¹

1. *Industries with High Risk for Occupational Morbidity.* In 1999, 25 industries had occupational injury and illness rates that were more than double the national rate. Workers in these industries made up 6% of the national private sector workforce but 17% of the reportable injuries and illnesses. Because the industries composing this group may change over time, the list of industries was reviewed and updated for 2003. When this update was completed, thirty-seven industries had occupational injury and illness rates that were more than double the national rate. These industries accounted for 6.7% of the national private sector non-farm wage and salary employment and 17% of the reportable injuries and illnesses in 2003.
2. *Occupations with High Risk for Occupational Morbidity.* In 1999, nationally, the rate of injuries and illnesses that resulted in “days away from work” was 1.9 cases per 100 workers. This rate in 2003 was 1.3. In order to determine the high risk morbidity occupations, in 1999, those occupations with rates for “days away from work” higher than 5 were selected, resulting in 23 occupations being selected as high risk morbidity occupations. In 2003, this list was reviewed and updated using as the criteria for selection those occupations with a rate higher than 2.6. There were 82 occupations that fit this condition.
3. *Industries with High Risk for Occupational Mortality.* In 1999, the Census of Fatal Occupational Injuries rate for the United States was 4.4 per 100,000 workers. In 2003 that rate was 4.0. In 1999, there were 27 industries with fatality rates higher than 10, and in 2003 there were 31 industries with fatality rates higher than 9.5. In 1999, those 27 industries comprised 14% of the private sector employment but 58% of all occupational

¹ The determination of high-risk industries and occupations for morbidity and mortality is using a process developed by the Council of State and Territorial Epidemiologists occupational health workgroup in conjunction with NIOSH and used in the CSTE publication Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000. September 2005.

fatalities. In 2003, the 31 industries represented 15% of the private sector employment but 61% of all fatalities.

4. *Occupations with High Risk for Occupational Mortality.* In 1999, there were 24 occupations that had fatality rates higher than 20 per 100,000 workers. In 2003, there were 57 occupations that had fatality rates higher than 9.5. In 1999, those 24 occupations comprised 6% of the private sector employment and 45% of the occupational fatalities. In 2003, the 57 occupations represented 11% of the private sector employment and 60% of the occupational fatalities.

The biggest numerical changes in employment of persons in high risk morbidity industries in North Carolina when comparing 2002 to 2003 were: (1) Nursing and Residential Care Facilities – an additional 20,362 persons between 2002 and 2003; (2) Wood Product Manufacturing – an additional 13,511 persons between 2002 and 2003; and (3) Couriers and Messengers – an additional 13,388 persons.

Comparing North Carolina to the National Data

1. *Industries with High Risk for Occupational Morbidity.* Nationally, 25 industries were identified in 1999 as having high risk for morbidity. In North Carolina from 1998 through 2002, the percent of persons in North Carolina employed in those industries was fairly constant, ranging between 6.2 and 6.4. Using the new list of industries identified in 2003, the percentage of workers in those industries rose to 7.5 in North Carolina. [See Figure 41.] This is higher than the 2003 national percentage of 6.7. The biggest numerical changes in North Carolina were: (1) Nursing and Residential Care Facilities – an additional 20,362 persons between 2002 and 2003²; (2) Wood Product Manufacturing – an additional 13,511 persons between 2002 and 2003³; and (3) Couriers and Messengers (NAICS code 492) – an additional 13,388 persons⁴. Information on the industries used to calculate these percentages can be found in Appendix B.
2. *Occupations with High Risk for Occupational Morbidity.* There has been an increase in North Carolina in the number of persons employed in occupations identified as having high risk for morbidity. From 1995 to 2002, the percent of persons in North Carolina employed in these occupations ranged between 6.1 and 7.8. [See Figure 42.] Using the new classification beginning in 2003, the North Carolina percentage rose to 15.1. The percentage in the United States also went from 6.1 in 2002 to 12.2 in 2003. The occupational categories are somewhat different for the years 1995 through 2002 compared to years beginning with 2003. In North Carolina for 2002, three of the occupational categories employed 2/3 of all of the persons in these occupations. These were: truck drivers (42%); laborers, except construction (14%); and construction

² For 1998 through 2002, only NAICS codes 62311 (Nursing care facilities), 62321 (Residential mental retardation facilities), and 62331 (Continuing care retirement facilities) were included. Beginning in 2003, everything in NAICS code 623 (Nursing care and Residential care facilities) was included.

³ For 1998 through 2002, only NAICS codes 321113 (Sawmills), 321912 (Cut stock, resawing lumber & planing), 321918 (Other millwork [including flooring]), 32192 (Wood container & pallet mfg), 321999 (All other miscellaneous wood product manufacturing) were included. Beginning in 2003, everything in NAICS code 321 (Wood product manufacturing) was included.

⁴ For 1998 through 2002, there were no NAICS codes in this category.

laborers (12%). In 2003, five of the 2003 occupational categories employed 2/3 of all of the persons in North Carolina in these occupations. These were: driver/sales workers and truck drivers (23%); nursing, psychiatric, and home health aides (14%); carpenters (12%); laborers and freight, stock, and material movers – hand (11%); and construction laborers (7%). Information on the occupations used to calculate these percentages can be found in Appendix C.

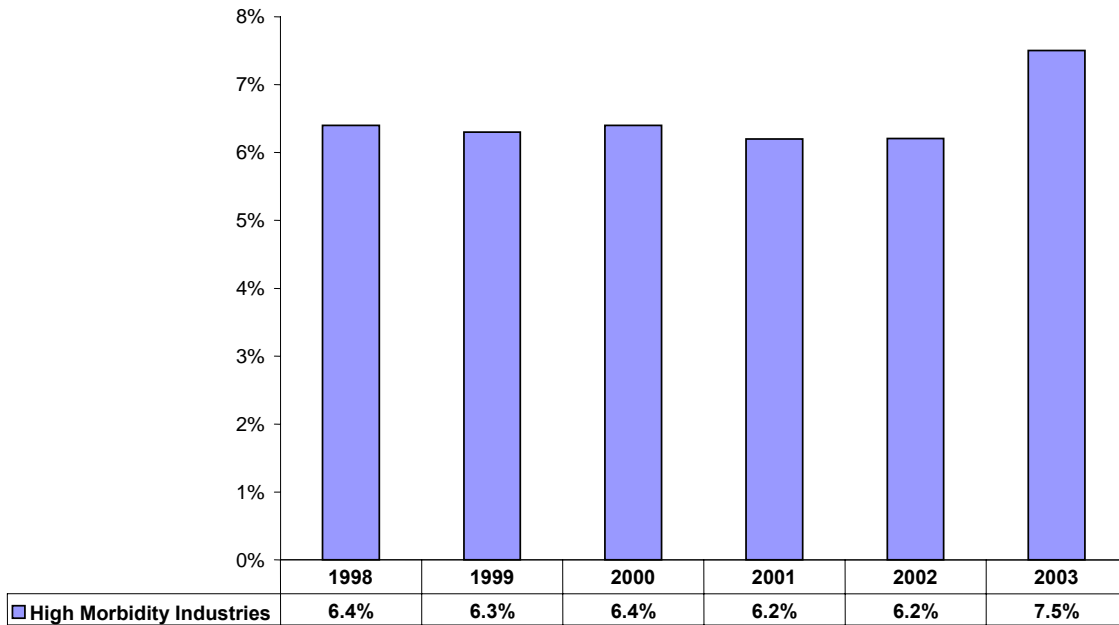
3. *Industries with High-Risk for Occupational Mortality.* The number of persons employed in these industries in North Carolina actually decreased from 2002 to 2003. From 1995 to 2002, the percent of persons in North Carolina employed in these industries ranged between 12.8 and 15.5. Using the new classification beginning in 2003, the North Carolina percentage dropped to 10.6. [See Figure 43.] At the same time, the percentage in the United States rose from 13.3 to 15.1. The industrial categories which employed

The number of persons employed in high mortality occupations in North Carolina has increased.

the largest number of persons in these industries in North Carolina in 2002 were: construction (58%) and trucking service (18%). In 2003, 2/3 of the persons in North Carolina employed in these industries were in construction (56%) and truck transportation (10%). Information on the industries used to calculate these percentages can be found in Appendix D.

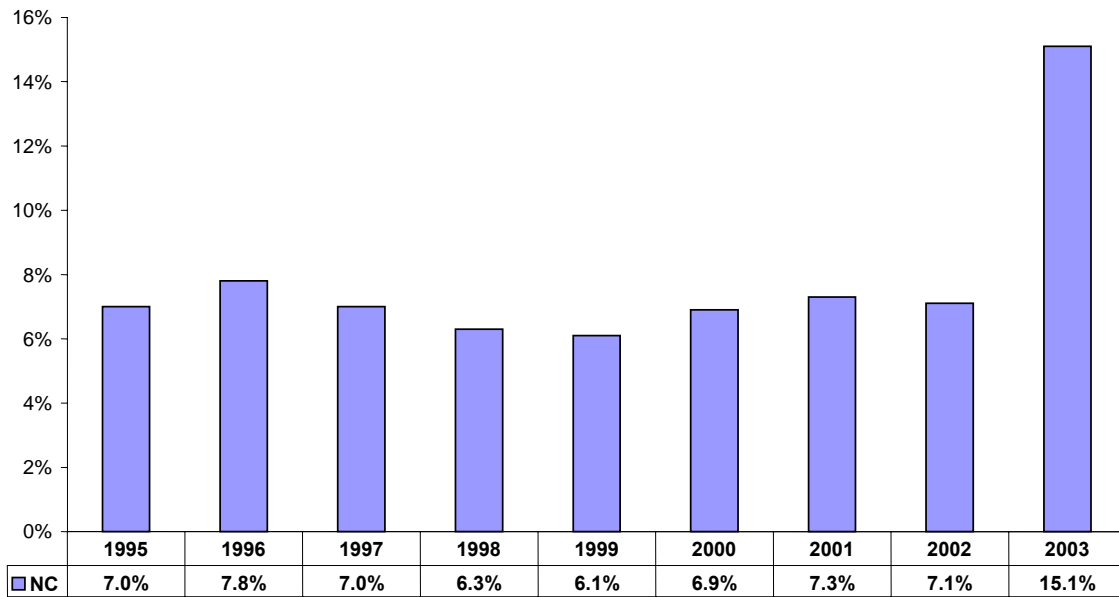
4. *Occupations with High Risk for Occupational Mortality.* The number of persons employed in these occupations in North Carolina has increased. During the period from 1995 to 2002, the percent of persons in North Carolina employed in these occupations ranged from 5.5 to 6.8. Using the new classification beginning in 2003, the North Carolina percentage rose to 12.9. The United States percentage rose from 6.5 to 12.9 between 2002 and 2003. The occupational categories that employed the largest number of persons in high mortality risk occupations in North Carolina in 2002 were: truck drivers (45%); construction laborers (13%); and farm workers (10%). In 2003, the occupational categories that comprised 65% of the workers were: driver/sales workers and truck drivers (26%); grounds maintenance workers (9%); construction laborers (8%); miscellaneous agricultural workers (8%); first-line supervisors/managers of construction trades and extraction workers (6%); and farmers and ranchers (6%). Information on the occupations used to calculate these percentages can be found in Appendix D.

Figure 42: Workers Employed in North Carolina Industries with High Risk for Occupational Morbidity: 1995 - 2003



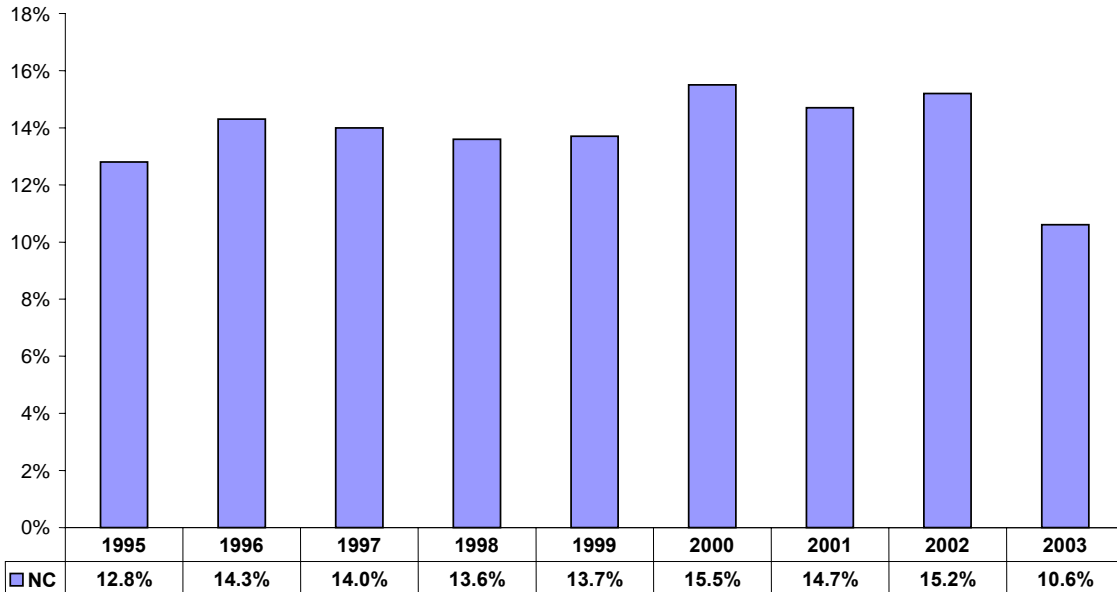
DATA SOURCE: Bureau of the Census County Business Patterns (CBP). North American Industry Classification System (NAICS) is used for industries. Industry categories are based on US numbers and were updated in 2003 to reflect changes.

Figure 43: Workers Employed in North Carolina Occupations with High Risk for Occupational Morbidity: 1995 - 2003



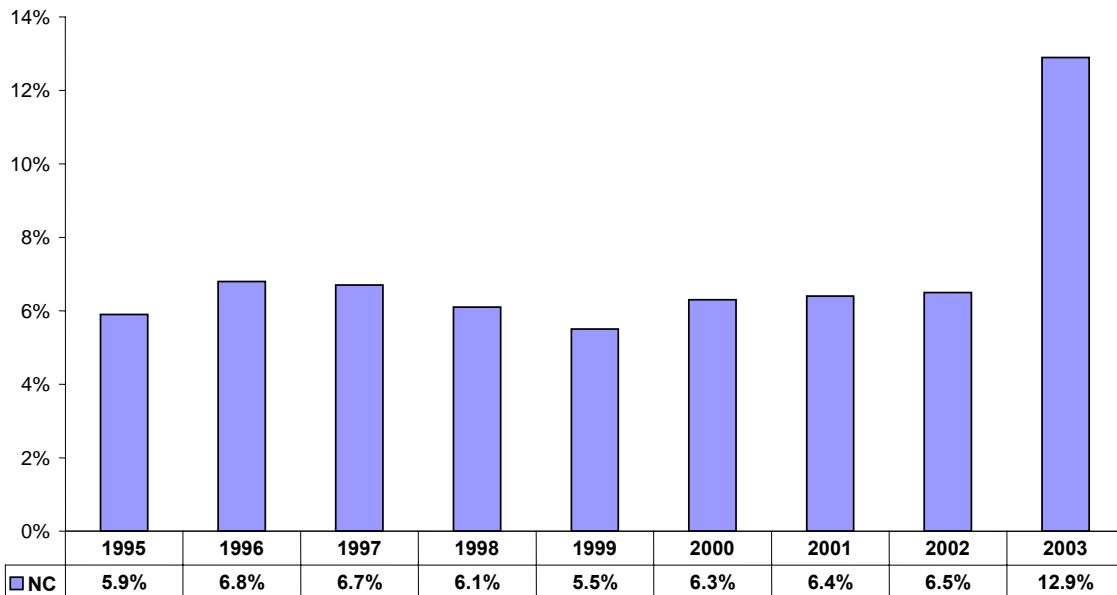
DATA SOURCE: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator).

Figure 44: Workers Employed in North Carolina Industries with High Risk for Occupational Mortality: 1995 - 2003



DATA SOURCE: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator).

Figure 45: Workers Employed in North Carolina Occupations with High Risk for Occupational Mortality: 1995 - 2003



DATA SOURCE: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator).

APPENDIX A: A Note About Healthy People 2010.

For several of the fatal and non-fatal occupational health indicators considered in this report, Healthy People 2010 (HP 2010) has been referenced. This section provides a brief background about HP 2010 and how it is related to this report.

HP 2010 is a comprehensive, national health promotion and disease prevention agenda designed to serve as an impetus for improving the health of all people in the United States during the first decade of the 21st century.

Like the preceding Healthy People 2000 initiative, HP 2010 is a 10-year strategy for improving the nation's health. The goal of HP 2010 is to promote health and prevent illness, disability and premature death. HP 2010 is built on initiatives from Healthy People 2000. Increasing quality and years of healthy life and eliminating health disparities guided the development of objectives for measuring progress. The objectives are organized into 28 focus areas, each representing an important public health area. Each objective has a target for improvements to be achieved by the year 2010. The focus area of concern in this report is Occupational Safety and Health. The goal of this focus area is promoting the health and safety of people at work through prevention and early intervention.

Tracking Healthy People 2010 Occupational Safety and Health Objectives in North Carolina

The Occupational Health Surveillance Unit of the Occupational and Environmental Epidemiology Branch has compiled information in this report for six of the objectives of this focus area. These are:

- 20-1 Reduce deaths from work-related injuries. This includes a focus on the following industries: construction; agriculture, forestry, and fishing; and transportation/public utilities.
- 20-2 Reduce work-related injuries resulting in medical treatment, lost time from work, or restricted work activity. This includes a focus on the following industries: construction; health services; agriculture, forestry, and fishing; transportation; mining; and manufacturing. Additionally, there is a focus on adolescent workers.
- 20-3 Reduce the rate of injury and illness cases involving days away from work due to overexertion or repetitive motion.
- 20-6 Reduce work-related assaults.
- 20-7 Reduce the number of persons who have elevated blood lead concentrations from work exposures.
- 20-8 Reduce occupational skin diseases or disorders among full-time workers.

Goals for these objectives have been set to be the **lower** of the following:

- a) A percentage improvement over the baseline year. (The percentage improvement is the same percentage as adapted by the national program.)
- b) “Best-To-Date.” While the national program uses a “better than the best” goal for the purpose of eliminating disparities (e.g., between gender, racial, ethnicity groups), North Carolina is using the term in a different manner. Best-to-date examines the years following the baseline through the most current year and determines the *best year* for that objective. If the rate for the best year is better than the selected percentage improvement over the baseline year, that rate will be the goal for 2010.
- c) “Total elimination.” The only objective where this was used was for adult blood lead levels. This is consistent with the national goal.

Differences in measurement between North Carolina’s and the National Healthy People 2010 Occupational Health Objectives.

For most of these objectives, similar measures have been used for North Carolina that were used at the national level. However, there are some differences, which are outlined below.

20-2 c. For this health services objective, North Carolina has looked not only at the private sector but also at the state government sector and the local government sector. As noted below, the state government health services objective is one of two that are not moving in the right direction.

20-2 h. For this objective, the national data source for the numerator was the National Electronic Injury Surveillance System (NEISS) reports of the number of work-related injuries among workers aged 15 to 17 years as reported in hospital emergency department records. The NEISS data are based on work-related injury data reported in a national sample of hospital emergency departments. Only those injuries designated as “work-related” are reported.

A state data source was not identified by HP 2010. Although emergency room data will be available in the future, it is not currently available for all North Carolina ERs. However, the North Carolina Occupational Health Surveillance Unit (OHSU) identified a data source for the numerator as the Annual Survey of Occupational Injuries and Illnesses (ASOII), DOL, BLS.

20-6. For this objective, the national data source for the numerator was the National Crime Victimization Survey (NCVS), DOJ, BJS. Specifically, this is the number of persons who report being the victim of an assault (see Comments) while working or on duty. An assault occurring on the way to or from work was not included.

A state data source was not identified by HP 2010. However, the OHSU identified a data source for the numerator as the Annual Survey of Occupational Injuries and Illnesses (ASOII), DOL, BLS. Specifically, this numerator was defined as the number of reported nonfatal occupational injuries due to work-related assaults among workers in all industries. For this objective, nonfatal occupational assaults include those to workers regardless of age that involve days away from work as well as those without lost workdays.

North Carolina's Progress Toward Healthy People 2010 Objective 2010: Promote the health and safety of people at work through prevention and early intervention.

On the next page, the six objectives (and their sub-objectives) that are used in this report are summarized. The following information is provided for each of these:

Objective: The number (in Healthy People 2010) and descriptive title of each objective/sub-objective.

Baseline Data for North Carolina: The rate for the measure in 1998 which is (for most objectives) considered the baseline year for the national data.

Goal Criteria for North Carolina: This will indicate which of the three criteria (30% improvement, best-to-date, or total elimination) was used to determine the 2010 goal.

North Carolina 2010 Goal: Based on the goal criteria, the measurable goal for the year 2010.

Most Recent Data for North Carolina: This is the rate (based on the most recent data available at the time) for North Carolina.

North Carolina Progress Toward Goal: This indicates if North Carolina is moving in the right or wrong direction based on the baseline data and the most current data.

United States Baseline Data: This provides information on the United States baseline data. Most (although not all) of the baseline years are 1998; baseline years other than 1998 are indicated below the rates in [].

United States 2010 Goal: Based on the national goal criteria, the measurable goal for the year 2010.

U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.

Healthy People 2010, Objective 20: Promote the health and safety of people at work through prevention and early intervention.

Objective	North Carolina					United States	
	Baseline Data [1998]	Goal Criteria	2010 Goal*	Most Recent Data	Progress Toward Goal (Right Direction/ Wrong Direction)	Baseline Data [1998 or as indicated]	2010 Goal
<i>20-1 Reduce deaths from work-related injuries</i>							
20-1a: All industry	6.0	30%	4.2	4.7	Right	4.5	3.2
20-1c: Construction	22.0	BTD	12.4	12.4	Right	14.6	10.2
20-1d: Transportation/ Public Utilities	19.0	BTD	9.2	9.2	Right	11.8	8.3
20-1e: Agriculture, forestry, and fishing	84.0	BTD	11.7	24.7	Right	24.1	16.9
<i>20-2 Reduce work-related injuries resulting in medical treatment, lost time from work, or restricted work activity</i>							
20-2a: All industry	6.0	30%	4.2	4.2	Right	6.2	4.3
20-2b: Construction	8.2	BTD	4.4	4.4	Right	8.7	6.1
20-2c: Health Services [Private]	6.5	BTD	4.1	4.1	Right	7.9 [1997]	5.5
Health Services [State]	11.2	30%	7.8	15.8	Wrong		
Health Services [Local]	6.8	30%	4.8	6.2	Right		
20-2d: Agriculture, forestry, and fishing	7.8	BTD	3.7	6.7	Right	7.6	5.3
20-2e: Transportation	7.2	BTD	4.7	6.6	Right	7.9 [1997]	5.5
20-2f: Mining	2.8	30%	2.0	2.5	Right	4.7	3.3
20-2g: Manufacturing	7.6	BTD	5.1	5.3	Right	8.5	6.0
20-2h: Adolescent workers	0.7	BTD	0.4	0.9	Wrong	4.8 [1997]	3.4
<i>20-3 Reduce the rate of injury and illness cases involving days away from work due to overexertion or repetitive motion</i>							
	498	BTD	289.0	289.0	Right	675 [1997]	338
<i>20.6 Reduce work-related assaults</i>	1.0	BTD	0.6	2.0	Wrong	0.85 [1987-92]	0.6
<i>20.7 Reduce the number of persons who have elevated blood lead concentrations from work exposures</i>	58.1	TOTAL ELIMINATION	0.0	29.8	Right	93.0 [1997]	0.0 [TOTAL ELIMINATION]
<i>20.8 Reduce occupational skin diseases or disorders among full-time workers</i>	49.0	BTD	32.0	32.0	Right	67	47.0

Appendix B: Industries with High Risk for Occupational Morbidity

Table 1. SIC codes and industry titles for industries with high risk for occupational morbidity in 1998-2002.

This list represents 25 industries based on the Standard Industrial Classification (SIC) system, the traditional governmental industrial coding system. The SIC system is being replaced by the North American Industrial Classification System (NAICS). In order to utilize the currently available data, the SIC codes were converted to NAICS codes. More than 25 NAICS codes were needed to match the original SIC industry list.

SIC 201: Meat Products
SIC 242: Sawmills and Planing Mills
SIC 244: Wood Containers
SIC 253: Public Building and Related Furniture
SIC 254: Partitions and Fixtures
SIC 321: Flat Glass
SIC 326: Pottery and Related Products
SIC 327: Concrete, Gypsum, and Plaster Products
SIC 332: Iron and Steel Foundries
SIC 333: Primary Smelting and Refining of Nonferrous Metals
SIC 334: Secondary Smelting and Refining of Nonferrous Metals
SIC 336: Nonferrous Foundries (Castings)
SIC 342: Cutlery, Handtools, and General Hardware
SIC 344: Fabricated Structural Metal Products
SIC 346: Metal Forgings and Stampings
SIC 353: Construction, Mining, and Materials Handling Machinery and Equipment
SIC 358: Refrigeration and Service Industry Machinery
SIC 371: Motor Vehicles and Motor Vehicle Equipment
SIC 373: Ship and Boat Building and Repairing
SIC 375: Motorcycles, Bicycles, and Parts
SIC 375: Miscellaneous Transportation Equipment
SIC 451: Scheduled Air Transportation and Air Courier Services
SIC 505: Wholesale of Metals and Minerals, Except Petroleum
SIC 805: Nursing and Personal Care Facilities
SIC 842: Botanical and Zoological Gardens

Table 2. NAICS codes and industry titles for industries with high risk for occupational morbidity in 2003.

This list represents 37 high risk industries based on the North American Industrial Classification System (NAICS) industrial coding system.

NAICS Industry Code	NAICS Industry Title
23813	Framing Contractors
31131	Sugar Manufacturing
311511	Fluid Milk Manufacturing
311512	Creamery Butter Manufacturing
31161	Animal Slaughtering and Processing
311821	Cookie and Cracker Manufacturing
312	Beverage and Tobacco Product Manufacturing
316211	Rubber and Plastic Footwear Manufacturing
321	Wood Products Manufacturing
322299	All Other Converted Paper Product Manufacturing
327213	Glass Container Manufacturing
327331	Concrete Block and Brick Manufacturing
32739	Other Concrete Product Manufacturing
3312	Steel Product Manufacturing From Purchased Steel
332211	Cutlery and Flatware Manufacturing
3315	Foundries
33231	Plate Work and Fabricated Structural Product Manufacturing
332323	Ornamental and Architectural Metal Work Manufacturing
33261	Spring and Wire Manufacturing
332919	Other Metal Value and Pipe Fitting Manufacturing
332998	Enameled Iron and Metal Sanitary Ware Manufacturing
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing
333312	Commercial Laundry, Dry Cleaning, and Pressing Machine Manufacturing
333412	Industrial and Commercial Fan and Blower Manufacturing Manufacturing
333923	Overhead Traveling Crane, Hoist, and Mon-rail System Manufacturing
3361	Motor Vehicle Manufacturing
33621	Motor Vehicle Body and Trailer Manufacturing
33635	Motor Vehicle Trans. and Power Train Parts Manufacturing
33637	Motor Vehicle Metal Stamping
33661	Ship and Boat Building
4248	Beer, Wine, and Distilled Alcoholic Beverage Wholesalers
4811	Scheduled Air Transportation
4851	Urban Transit Systems
492	Couriers and Messengers
49311	Warehousing and Storage
623	Nursing and Residential Care Facilities
7131	Amusement Parks and Arcades

Appendix C: Occupations with High Risk for Occupational Morbidity

Table 1. Occupational titles for occupations with high risk for occupational morbidity in 1995 - 2002.

This list represents 23 high-risk occupations based on the 1990 Bureau of the Census Occupations coding system.

Census Occupation Title

Technicians, not elsewhere classified
Miscellaneous food preparation occupations
Public transportation attendants
Timber cutting and logging occupations
Telephone line installers and repairers
Electrician apprentices
Sheetmetal duct installers
Structural metal workers
Punching and stamping press machine operators
Grinding, abrading, buffing and polishing machine operators
Sawing machine operators
Extruding and forming machine operators
Furnace, kiln, and oven operators, exc. food
Crushing and grinding machine operators
Truck drivers
Driver-sales workers
Excavating and loading machine operators
Misc. material moving equipment operators
Helpers, construction trades
Construction laborers
Production helpers
Freight, stock, and material handlers, not elsewhere classified
Laborers, except construction

Table 2. Occupational titles for occupations with high risk for occupational morbidity in 2003.

This list represents 82 high-risk occupations based on the 2000 Bureau of the Census Occupations coding system.

Census Occupation Title

Actors
Emergency medical technicians and paramedics
Nursing, psychiatric, and home health aides
1st line supervisors /managers of correctional officers
Fire fighters
Fire inspectors
Combined food prep. and serving workers, including fast food
Food servers, non-restaurant
Food preparation and serving related workers, all others
Pest control workers
Transportation attendants
Reservation and transportation ticket agents and travel clerks
Cargo and freight agents
Animal breeders
Logging workers
Carpenters
Construction laborers
Paving, surfacing, and tamping equipment operators
Pile driver operators
Glaziers
Insulation workers
Reinforcing iron and rebar workers
Sheet metal workers
Structural iron and steel workers
Helpers, construction trades
Septic tank services and sewer pipe cleaners
Miscellaneous construction and related workers
Derrick, drill, and service unit operators, oil, gas, and mining
Earth drillers, except oil and gas
Roof bolters, mining
Roustabouts, oil and gas
Helpers, extractive workers
Other extractive workers
Electrical and electronics installers/repairers, transportation equipment
Electrical and electronics installers/repairers, industrial and utility
Aircraft mechanics and service technicians
Heavy vehicle and mobile equipment service technicians and mechanics
Misc. vehicle and mobile equipment mechanics, installers, and repairers
Heating, air conditioning, and refrig. mechanics, installers, and repairers
Home appliance repairers
Maintenance and repair workers, general
Maintenance workers, machinery
Telecommunications line installers and repairers

Riggers
Signal and track switch repairers
Helpers of installation, maintenance, and repair workers
Aircraft structure, surfaces, rigging, and system assemblers
Engine and other machine assemblers
Food/tobacco roasting, baking, and drying machine operators, tenders
Food cooking machine operators, tenders
Extruding/drawing machine setters, operators, tenders-metal and plastic
Rolling machine setters, operators, tenders-metal and plastic
Lathe and turning machine tool setters, operators, tenders-metal and plastic
Milling and planing machine setters, operators, tenders-metal and plastic
Metal furnace and kiln operators, tenders
Molders and molding machine setters, operators, tenders-metal and plastic
Multiple machine tool setters, operators, tenders-metal and plastic
Layout workers-metal and plastic
Bookbinders and bindery workers
Extruding and forming machine setters, operators, tenders-synthetic and glass fibers
Sawing machine setters, operators, tenders-wood
Woodworking machine setters, operators, tenders, except sawing
Crushing, grinding, polishing, mixing, and blending workers
Cutting workers
Extruding, forming, pressing, and compacting machine setters, operators, tenders
Cooling and freezing equipment operators, tenders
Molders, shapers, and casters, except metal and plastic
Tire builders
Helpers for production workers
Production workers, all other
Ambulance drivers & attendants except EMT
Driver/sales workers and truck drivers
Railroad brake, signal, and switch operators
Railroad conductors and yardmasters
Sailors and marine oilers
Ship engineers
Other transportation workers
Conveyor operators, tenders
Laborers and freight, stock, and material movers-hand
Machine feeders and offbearers
Refuse and recyclable material collectors
Shuttle car operators
Material moving workers, all other

Appendix D: Industries and Occupations with High Risk for Occupational Mortality

1995 - 2002

This list represents 27 high-risk industries based on the 1990 Bureau of the Census Industries coding system and 24 high-risk occupations based on the 1990 Bureau of the Census Occupations coding system.

Industries:

Agricultural crop production
Agricultural livestock production
Landscape and horticultural services
Agricultural services
Forestry
Fishing, hunting and trapping
Metal mining
Coal mining
Oil and gas extraction
Nonmetallic mining and quarrying, except fuel
Construction
Miscellaneous petroleum and coal products
Logging
Cement, concrete, gypsum and plaster products
Ship and boat building and repair
Taxicab service
Trucking service
Water transportation
Sanitary services
Wholesale motor vehicles and equipment
Wholesale scrap and waste materials
Wholesale farm product raw materials
Wholesale petroleum products
Mobile home dealers
Miscellaneous vehicle dealers
Liquor stores
Electrical repair shops

Occupations:

Airplane pilots and navigators
Guides
Farmers, except horticultural
Managers, farms, except horticultural
Supervisors, farm workers
Farm workers
Timber cutting and logging occupations
Fishers
Electrician apprentices
Electrical power installers and repairers
Roofers
Structural metal workers
Constructions trades, not elsewhere classified
Supervisors, extractive occupations
Mining machine operators
Truck drivers
Driver-sales workers
Taxicab drivers and chauffeurs
Sailors and deckhands
Excavating and loading machine operators
Grader, dozer, and scraper operators
Miscellaneous material moving equipment
Construction laborers

2003

This list represents 31 high risk industries based on the 2000 Bureau of the Census Industries coding system and 57 high risk occupations based on the 2000 Bureau of the Census Occupations coding system.

Industries:

Crop production
Animal production
Logging
Fishing, hunting, trapping
Support Activities for Agriculture and Forestry
Oil and Gas Extraction
Coal mining
Nonmetallic Mineral Mining and Quarrying
Support Activities for Mining
Construction
Cement, Concrete, Lime, and Gypsum Product Mfg.
Miscellaneous nonmetallic mineral product mfg.
Foundries
Sawmills and Wood Preservation
Veneer, Plywood, and Engineered Wood Product Mfg.
Recyclable material wholesalers
Farm product raw materials wholesalers
Petroleum and Petroleum Product Wholesalers
Other motor vehicle dealers
Fuel dealers

Occupations:

Farm, Ranch, and Other Agricultural Managers
Farmers and Ranchers
Petroleum Engineers
Fire Fighters
Security Guards and Gaming Surveillance Officers
Crossing Guards
First-line Supervisors/Managers of Housekeeping and Janitorial Workers
Grounds Maintenance Workers
Animal Trainers
First-line Supervisors/Managers of Farming, Fishing, and Forestry Workers
Miscellaneous Agricultural Workers
Fishers and Related Fishing Workers
Logging Workers
First-line Supervisors/Managers of Construction Traders and Extraction Workers
Boilermakers
Cement Masons, Concrete Finishers, and Terrazzo Workers
Construction Laborers
Paving, Surfacing, and Tamping Equipment Operators
Operation Engineers and Other Construction Equip. Ops.
Electricians

2003 [continued]

Industries [continued]:

Water transportation
Truck transportation
Taxi and Limousine Service
Scenic and Sightseeing Transportation
Services Incidental to Transportation
Commercial, Industrial, and Other Intangible Assets
Rental and Leasing
Landscaping services
Waste Management and Remediation Services
Recreational Vehicle Parks and Camps, and Rooming
and Boarding Houses
Drinking places, alcoholic beverages

Occupations [continued]:

Plasterers and Stucco Masons
Roofers
Structural Iron and Steel Workers
Helpers, Construction Trades
Hazardous Materials Removal Workers
Miscellaneous Construction and Related Workers
Derrick, Rotary Drill, and Service Unit Operators, Oil,
Gas, and Mining
Earth Drillers, Except Oil and Gas
Mining Machine Operators
Roustabouts, Oil and Gas
Helpers, Extraction Workers
Explosives Workers, Ordnance Handling Experts, and
Blasters
Roof Bolters, Mining
Other Extraction Workers
First-line Supervisors/Managers of Mechanics,
Installers, and Repairers
Miscellaneous Vehicle and Mobile Equipment
Mechanics, Installers, and Repairers
Maintenance and Repair Workers, General
Maintenance Workers, Machinery
Electronic Power-line Installers and Repairers
Telecommunications Line Installers and Repairers
Commercial Drivers
Helpers--Installation, Maintenance, and Repair
Workers

2003 [continued]

Occupations [continued]:

Water and Liquid Waste Treatment Plant and System Operators

Aircraft Pilots and Flight Engineers

Driver/Sales Workers and Truck Drivers

Taxi Drivers and Chauffeurs

Motor Vehicle Operators, All Other

Railroad Brake, Signal, and Switch Operators

Railroad Conductors and Yardmasters

Sailors and Marine Oilers

Ship and Boat Captains and Operators

Crane and Tower Operators

Dredge, Excavating, and Loading Machine Operators

Pumping Station Operators

Refuse and Recyclable Material Collectors

Material Moving Workers, All Other