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Overview of Workplaces and Occupations in Health Care

James M. Boiano and John P.E. Sestito

Health care is part of Health Care and Social Assistance (HCSA) sector, defined by North American Industry Classification System (NAICS) Sector 62.¹ Industries in this sector are arranged on a continuum starting with those establishments providing medical care exclusively, continuing with those providing health care and social assistance, and finally those providing only social assistance. Many of the industries in the sector are defined based on the educational degree held by the practitioners included in the industry. This sector is comprised of four subsectors: ambulatory health care services (621), hospitals (622), nursing and residential care facilities (623), and social assistance (624) and their respective constituent four digit industries; the first three subsectors collectively represent Health Care and are the focus of this section.

Health Care includes both employer (i.e., with paid employees) and nonemployer (i.e., without paid employees or self-employed) establishments, with the exception of hospitals that does not include the latter. Based on the most recent Economic Census figures (2002), there are over 564,000 employer establishments and over 739,000 self-employed establishments in Health Care, representing 8.2% and 4.2%

TABLE 2.1 Number of Employer and Self-Employed Establishments by Health Care Subsector and Industry, 2002

2002 NAICS	Industry	Number of Establishments	
		Employer ^a	Self-Employed ^b (Nonemployer)
621	Ambulatory health care services	489,021	697,239
6211	Physician offices	203,118	171,497
6212	Dental offices	118,305	33,234
6213	Offices of other health practitioners	104,222	284,314
6214	Outpatient care centers	25,750	7,717
6215	Medical and diagnostic laboratories	11,079	16,461
6216	Home health care services	17,666	132,685
6219	Other ambulatory health care services	8,881	51,331
622	Hospitals	6,411	NA ^c
6221	General medical and surgical	5,193	NA
6222	Psychiatric and substance abuse	603	NA
6223	Specialty (other than 6,222)	615	NA
623	Nursing and residential care facilities	69,342	42,571
6231	Nursing care facilities	16,568	—
6232	Residential mental retardation, mental health, and substance abuse facilities	28,508	—
6233	Community care facilities for the elderly	17,988	—
6239	Other residential care facilities	6,278	—
62, except 624	Health care	564,774	739,810
	All industry sectors ^d	6,891,382	17,646,062

Note: Dash (—) indicates that estimates are unavailable.

^a*Source:* From Economic Census 2002, www.census.gov/econ/census02/data/us/US000_62.HTM. Includes only establishments of firms with paid employees and subject to payroll tax.

^b*Source:* From Economic Census Nonemployer Statistics 2002, www.census.gov/epcd/nonemployer/2002/us/US000_62.HTM. Includes establishments of firms with no paid employees and not subject to payroll tax (typically self-employed individuals). Each distinct business income tax return filed by a nonemployer business is counted as an establishment. Nonemployer businesses may operate from a home address or a separate physical location.

^c Not applicable (NA), there are no self-employed establishments in this subsector.

^d Excludes public administration, i.e., federal, state, and local government agencies.

of all establishments, respectively (Table 2.1). Ambulatory health care services represents over 91% of all establishments in Health Care. Establishments of the self-employed far outnumber employed establishments in home health care services, offices of other health care practitioners, and other ambulatory health services. Offices of physicians, dentists, or other health practitioners represent 75% of employer and 66% of self-employed establishments. Hospitals represent less than 2% of all establishments in Health Care; over 80% of hospitals provide general medical and surgical services.

Employment and Forecast

There are over 14 million private, government, and self-employed workers in Health Care, representing over 10% of all employment (Table 2.2). Ambulatory health care services and hospitals account for over 82% of employed persons. Hospitals account for nearly 40% of employed persons and the largest number of government workers (0.74 million). Over half of the employed persons in ambulatory health care services represent offices of health practitioners (physicians, dentists, etc.).

TABLE 2.2 Number of Private and Government Wage and Salary Workers and Self-Employed Workers by Health Care Subsector and Industry, 2006 (Numbers in Thousands)

2002 NAICS	Industry	Total ^a	Wage and Salary Workers						Self-Employed Workers
			Total ^a	Private	Government				
					Total	Federal	State	Local	
621	Ambulatory health care services ^b	6,133	5,733	5,457	275	22	104	148	393
6211	Physician offices	1,785	1,685	1,661	23	7	11	5	99
6212	Dental offices	852	784	777	7	1	4	2	63
6213	Offices of other health practitioners	553	427	423	4	0	1	3	125
6214	Outpatient care centers	919	894	788	106	7	34	65	25
6216	Home health care services	928	866	801	65	1	34	29	62
6219	Other ambulatory health care services	1,096	1,077	1,007	70	6	20	44	19
622	Hospitals	5,712	5,703	4,963	740	206	330	204	9
623	Nursing and residential care facilities	2,507	2,478	2,304	173	11	85	78	28
6231	Nursing care facilities	1,807	1,798	1,696	101	6	40	55	9
6232, 6233, and 6239	Residential care facilities (without nursing)	700	680	608	72	5	45	23	19
62, except 624	Health care	14,352	13,813	12,724	1,190	240	519	429	429
	All industry sectors (16 years and over)	144,427	133,736	113,347	20,389	3,362	6,099	10,927	10,586

Source: From Current Population Survey, Table 16, Employed and experienced unemployed persons by detailed industry and class of worker, Annual Average 2006, <http://www.bls.gov/cps/cpsaat16.pdf>

^a Totals may not add up due to exclusion of unpaid family workers.

^b Excludes medical and diagnostic laboratories (NAICS 6215), where data is unavailable.

TABLE 2.3 Employment and Forecast by Health Care Subsector and Industry, 2004–2014

2002 NAICS	Industry	Employment (in Thousands)		Percent Growth
		2004	2014	
621	Ambulatory health care services	4,946	7,031	42
6211, 6212, and 6213	Offices of health practitioners	3,337	4,561	37
6216	Home health care services	773	1,310	69
6214, 6215, and 6219	Outpatient, laboratory, and other ambulatory health care services	836	1,160	38
622	Hospitals (private)	4,294	4,982	16
623	Nursing and residential care facilities	2,815	3,597	28
6231	Nursing care facilities	1,575	1,757	11
6232, 6233, and 6239	Residential care facilities	1,240	1,840	48
62, except 624	Health care	12,055	15,610	30
	All industry sectors	145,612	164,540	13

Source: From Berman, J.M., *Mon. Labor Rev.*, 128(11), 45, 2005, <http://www.bls.gov/opub/mlr/2005/11/art4full.pdf>

Note: Employment data for wage and salary workers are from the BLS establishment-based Current Employment Statistics Survey.

By 2014, Health Care is expected to grow by over 3.5 million jobs (30%), or about one out of every five new jobs (Table 2.3). Ambulatory health care services leads all Health Care subsectors with a projected 42% growth, adding nearly 2.1 million new jobs. Over 1.2 million (59%) of these new jobs will be in offices of health practitioners. Home health care services is leading the growth in this subsector (nearly 70%), and has the distinction of being the nation’s fastest growing employer by 2014. Residential care facilities represent the second largest projected growth (48%), adding 0.60 million new jobs by 2014. Although projected growth in hospitals is a modest 16% by 2014, over 0.68 million new jobs will be added, ranking second only to offices of health practitioners. Health Care accounts for 4 of the 20 fastest growing industries (Table 2.4) and 5 of the 20 largest growing industries (Table 2.5).

Occupations and Forecast

Workers in Health Care represent a diverse group of professional, technical, and service occupations. Table 2.6 lists the 10 largest health care occupations by occupational title, as defined by the standard occupational code (SOC), for each of the three subsectors. Registered nurses constitute the largest occupation with nearly 2 million, of which over 70% are employed in hospitals. Other predominant occupations include nursing aides, orderlies, and attendants (1.2 million); licensed practical nurses and licensed vocational nurses (0.6 million); home health aides (0.5 million); medical assistants (0.3 million); and personal and home care aides (0.3 million). Collectively, these five occupational groups represent over 20% of all Health Care workers. Within hospitals, the three largest occupations are related to nursing care (registered nurses; nursing aides, orderlies, and attendants; and licensed practical nurses and licensed vocational nurses), and account for over 2 million jobs in 2005.

Rapid growth is projected for many occupations in Health Care from 2004 to 2014. Thirteen of the 30 fastest growing occupations are in Health Care, 6 of which are in the top 10 (Table 2.7). Home health aides, with an expected growth of 56%, are the nation’s fastest growing occupation. Health Care accounts for 5 of the 30 largest growing occupations by 2014 (Table 2.8). The number of registered nurses

TABLE 2.4 Industries with Fastest Growing Employment, 2004–2014

2002 NAICS	Industry	Employment (in Thousands)		Percent Growth 2004–2014
		2004	2014	
6216	Home health care services	773	1,310	69
5112	Software publishers	239	400	67
5416	Management, scientific, and technical consulting services	779	1,250	60
6232, 6233, and 6239	Residential care facilities	1,240	1,840	48
5612	Facilities support services	116	170	46
5613	Employment services	3,470	5,050	45
7115	Independent artists, writers, and performers	42	61	45
5611	Office administrative services	319	450	41
5415	Computer systems design and related services	1,147	1,600	39
6214, 6215, and 6219	Outpatient, laboratory, and other ambulatory health care services	836	1,160	38
6244	Child day care services	767	1,062	38
6114–17	Other educational services	475	650	37
6211, 6212, and 6213	Offices of health practitioners	3,337	4,561	37
5412	Accounting, tax preparation, bookkeeping, and payroll services	816	1,100	35
6112 and 6113	Junior colleges, colleges, universities, and professional schools	1,462	1,965	34
6241, 6242, and 6243	Individual, family, community, and vocational rehabilitation services	1,365	1,810	33
487	Scenic and sightseeing transportation	27	35	30
5622 and 5629	Waste treatment and disposal and waste management services	206	268	30
5419	Other professional, scientific, and technical services	503	646	28
5414	Specialized design services	121	155	28

Source: From Berman, J.M., *Mon. Labor Rev.*, 128(11), 45, 2005, <http://www.bls.gov/opub/mlr/2005/11/art4full.pdf>
Note: Bold indicates industries in Health Care.

is expected to grow by 0.7 million, the second largest increase across all industry sectors and ranking first among Health Care occupations. The number of home health aides is expected to grow by 0.35 million, the ninth largest increase across all industries and representing the second largest growing occupation in Health Care.

Combined establishment and employment figures yield the following salient facts² about Health Care:

- Hospitals account for less than 2% of the health care establishments, but employ 40% of all health care workers.
- More than 70% of hospital employees are in establishments with 1000 or more workers.
- Over 85% of nonhospital health care establishments employ fewer than 20 workers, and about 50% employ 5 or fewer workers.
- Nearly 70% of nonhospital employees are employed in establishments with 20 or more workers.

TABLE 2.5 Industries with Largest Employment Growth, 2004–2014

2002 NAICS	Industry	Employment (in Thousands)		Change 2004–2014
		2004	2014	
44 and 45	Retail trade	15,034	16,683	1,649
5613	Employment services	3,470	5,050	1,580
722	Food services and drinking places	8,850	10,301	1,451
6211, 6212, and 6213	Offices of health practitioners	3,337	4,561	1,224
23	Construction	6,965	7,757	792
NA	Local government educational services	7,762	8,545	783
622	Hospitals (private)	4,294	4,982	688
6232, 6233, and 6239	Residential care facilities	1,240	1,840	600
6216	Home health care services	773	1,310	537
6112 and 6113	Junior colleges, colleges, universities, and professional schools	1,462	1,965	503
NA	Local government enterprises except passenger transit	4,216	4,699	483
42	Wholesale trade	5655	6131	476
5416	Management, scientific, and technical consulting services	779	1,250	471
5415	Computer systems design and related services	1,147	1,600	453
6241, 6242, and 6243	Individual, family, community, and vocational rehabilitation services	1,365	1,810	445
NA	State government educational services	2,249	2,691	442
713	Amusement, gambling, and recreation industries	1,351	1,710	359
5617	Services to buildings and dwellings	1,694	2,050	356
6214, 6215, and 6219	Outpatient, laboratory, and other ambulatory health care services	836	1,160	324
721	Accommodation	1,796	2,100	304

Source: From Berman, J.M., *Mon. Labor Rev.*, 128(11), 45, 2005, <http://www.bls.gov/opub/mlr/2005/11/art4full.pdf>
Note: Bold indicates industries in Health Care.

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TABLE 2.6 Ten Largest Occupations by Health Care Subsector, 2005

SOC ^a	Occupation	Total Employed ^b
Ambulatory Health Care Services (NAICS 621)		
29-1111	Registered nurses	408,180
31-9092	Medical assistants	306,010
43-4171	Receptionists and information clerks	282,980
43-6013	Medical secretaries	263,710
31-9091	Dental assistants	259,810
31-1011	Home health aides	232,500
39-9021	Personal and home care aides	203,150
43-9061	Office clerks (general)	184,520
29-2061	Licensed practical nurses and licensed vocational nurses	164,420
29-2021	Dental hygienists	157,150
Hospitals (NAICS 622)		
29-1111	Registered nurses	1,424,860
31-1012	Nursing aides, orderlies, and attendants	403,500
29-2061	Licensed practical nurses and licensed vocational nurses	187,420
43-9061	Office clerks (general)	123,420
37-2012	Maids and housekeeping cleaners	121,850
29-2034	Radiological technologists and technicians	110,710
29-2070	Medical records and health information technicians	97,270
43-6013	Medical secretaries	93,450
11-9111	Medical and health services managers	92,650
43-4111	Interviewers (except eligibility and loan)	81,820
Nursing and Residential Care Facilities (NAICS 623)		
31-1012	Nursing aides, orderlies, and attendants	759,650
31-1011	Home health aides	254,340
29-2061	Licensed practical nurses and licensed vocational nurses	234,090
29-1111	Registered nurses	157,870
37-2012	Maids and housekeeping cleaners	116,590
39-9021	Personal and home care aides	102,180
35-2012	Cooks (institutional and cafeteria)	78,130
35-2021	Food preparation workers	68,570
39-9011	Child care workers	50,500
39-9032	Recreation workers	47,970

Note: Estimates do not include self-employed workers.
^a *Source:* From 2000 SOC, BLS.
^b *Source:* From National industry-specific occupational employment and wage estimates, May 2005: http://www.bls.gov/oes/current/naics3_621000.htm, http://www.bls.gov/oes/current/naics3_622000.htm, and http://www.bls.gov/oes/current/naics3_623000.htm

TABLE 2.7 Thirty Fastest-Growing Occupations, All Industry Sectors, 2004–2014

SOC	Occupation	Employment (in Thousands)		Percent Growth
		2004	2014	
31-1011	Home health aides	624	974	56.0
15-1081	Network systems and data communications analysts	231	357	54.6
31-9092	Medical assistants	387	589	52.1
29-1071	Physician assistants	62	93	49.6
15-1031	Computer software engineers (applications)	460	682	48.4
31-2021	Physical therapist assistants	59	85	44.2
29-2021	Dental hygienists	158	226	43.3
15-1032	Computer software engineers (systems software)	340	486	43.0
31-9091	Dental assistants	267	382	42.7
39-9021	Personal and home care aides	701	988	41.0
15-1071	Network and computer systems administrators	278	385	38.4
15-1061	Database administrators	104	144	38.2
29-1123	Physical therapists	155	211	36.7
19-4092	Forensic science technicians ^a	10	13	36.4
29-2056	Veterinary technologists and technicians	60	81	35.3
29-2032	Diagnostic medical sonographers	42	57	34.8
31-2022	Physical therapist aides	43	57	34.4
31-2011	Occupational therapist assistants	21	29	34.1
19-1042	Medical scientists (except epidemiologists) ^a	72	97	34.1
29-1122	Occupational therapists	92	123	33.6
25-2011	Preschool teachers (except special education)	431	573	33.1
29-2031	Cardiovascular technologists and technicians	45	60	32.6
25-1000	Postsecondary teachers	1628	2153	32.2
19-2043	Hydrologists	8	11	31.6
15-1051	Computer systems analysts	487	640	31.4
47-4041	Hazardous materials removal workers	38	50	31.2
17-2031	Biomedical engineers ^a	10	13	30.7
13-1071	Employment, recruitment, and placement specialists	182	237	30.5
7-2081	Environmental engineers	49	64	30.0
23-2011	Paralegals and legal assistants	224	291	29.7

Source: From Hecker, D.E., *Mon. Labor Rev.*, 128(11), 70, 2005, <http://www.bls.gov/opub/mlr/2005/11/art5full.pdf>
Notes: Employment data for wage and salary workers are from the BLS establishment-based Current Employment Statistics Survey. Bold indicates health care occupations as defined by two SOC major groups: Health Care Practitioner and Technical Occupations (29-0000) and Health Care Support Occupations (31-0000).
^a Health-care-related occupations.

TABLE 2.8 Thirty Largest-Growing Occupations, All Industry Sectors, 2004–2014

SOC	Occupation	Employment (in Thousands)		Change 2004–2014
		2004	2014	
41-2031	Retail salespersons	4256	4992	736
29-1111	Registered nurses	2394	3096	703
25-1000	Postsecondary teachers	1628	2153	524
43-4051	Customer service representatives	2063	2534	471
37-2011	Janitors and cleaners (except maids and housekeepers)	2374	2813	440
35-3031	Waiters and waitresses	2252	2627	376
35-3021	Combined food preparation and serving workers	2150	2516	367
31-1011	Home health aides	624	974	350
31-1012	Nursing aides, orderlies, and attendants	1455	1781	325
11-1021	General and operations managers	1807	2115	308
39-9021	Personal and home care aides	701	988	287
25-2021	Elementary school teachers (except special education)	1457	1722	265
13-2011	Accountants and auditors	1176	1440	264
43-9061	Office clerks (general)	3138	3401	263
53-7062	Laborers and freight, stock, and material movers (hand)	2430	2678	248
43-4171	Receptionists and information clerks	1133	1379	246
37-3011	Landscaping and groundskeeping workers	1177	1407	230
53-3032	Truck drivers (heavy and tractor-trailer)	1738	1962	223
15-1031	Computer software engineers (applications)	460	682	222
49-9042	Maintenance and repair workers (general)	1332	1533	202
31-9092	Medical Assistants	387	589	202
43-6011	Executive secretaries and administrative assistants	1547	1739	192
41-4012	Sales representatives	1454	1641	187
47-2031	Carpenters	1349	1535	186
25-9041	Teachers' assistants	1296	1478	183
39-9011	Child care workers	1280	1456	176
35-2021	Food preparation workers	889	1064	175
37-2012	Maids and housekeeping cleaners	1422	1587	165
53-3033	Truck drivers (light or delivery services)	1042	1206	164
15-1051	Computer systems analysts	487	640	153

Source: From Hecker, D.E., *Mon. Labor Rev.*, 128(11), 70, 2005, <http://www.bls.gov/opub/mlr/2005/11/art5full.pdf>

Notes: Employment data for wage and salary workers are from the BLS establishment-based Current Employment Statistics Survey. Bold indicates health care occupations as defined by two SOC major groups: Health Care Practitioner and Technical Occupations (29-0000) and Health Care Support Occupations (31-0000).

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Demographic Characteristics of Workers in Health Care

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By Workplace

Selected demographic characteristics of employed persons in Health Care are provided by subsector, constituent industries (where available) and for all industries, for comparison purposes (Tables 2.9 and 2.10). These characteristics include gender, race and ethnicity, and age.

About 78% (11.2 million) of the workers in Health Care are women, more than any other industry sector and about 70% higher than the average for all industries (Table 2.9). Among industries (four digit codes), home health care employs the greatest percentage of women (90%), followed by nursing care facilities (85%) and dental offices (80%). The lowest percentage of women are employed by other ambulatory health care services and offices of other health practitioners (68.6% and 69.3%, respectively).

Available data on sex, race, and ethnicity show that there is a greater percentage of Blacks and Asians in Health Care when compared to all industries, while the percentage of Hispanics is somewhat less (Table 2.9). Blacks represent about 16% (2.3 million) of the workers in Health Care, leading all industry sectors, and 1.5 times the industry average of nearly 11%. Hospitals employ the largest number of Blacks in Health Care (0.94 million), followed by ambulatory health care services (0.70 million). Home health

TABLE 2.9 Percent Distribution of Employment within Health Care by Sex, Race, and Hispanic or Latino Ethnicity, 2006

2002 NAICS Code ^a	Industry	Total Employed ¹ (in Thousands)	Women	Percent of Total		
				Black or African American	Hispanic or Latino	Asian
621	Ambulatory health care services ^b	6,133	77.2	11.5	9.9	6.6
6211	Physician offices	1,785	76.4	6.9	8.7	6.5
6212	Dental offices	852	79.7	3.6	9.6	6.3
6213	Offices of other health practitioners	553	69.3	3.2	5.4	4.6
6214	Outpatient care centers	919	78.4	12.2	11.0	5.4
6216	Home health care services	928	90.2	27.0	16.7	4.1
6219	Other ambulatory health care services	1,096	68.6	15.8	8.0	6.9
622	Hospitals	5,712	76.6	16.4	7.6	7.0
623	Nursing and residential care facilities	2,507	82.0	24.6	8.6	4.1
6231	Nursing care facilities	1,807	85.5	26.7	8.3	4.5
6232, 6233, and 6239	Residential care facilities (without nursing)	700	73.0	19.1	9.3	3.0
62, except 624	Health care	14,352	77.8	15.7	8.7	6.3
	All industry sectors (16 years and over)	144,427	46.3	10.9	13.6	4.5

Source: From Current Population Survey, Household Data Annual Averages, Table 18 Employed persons by detailed industry, sex, race, and Hispanic or Latino ethnicity, 2006, <ftp://ftp.bls.gov/pub/special.requests/lf/aat18.txt>

^a NAICS, U.S. Census Bureau, www.census.gov/epcd/www/naics.html

^b Excludes medical and diagnostic laboratories (NAICS 6215); data are unavailable.

TABLE 2.10 Percent Distribution of Employment in Health Care by Age, 2006

2002 NAICS Code ^a	Industry	Total Employed ^b (in Thousands)	Percent Distribution of Employment by Age Group						
			16–19	20–24	25–34	35–44	45–54	55–64	65 and Over
621	Ambulatory health care services ^a	6,133	1.5	6.9	21.9	25.1	26.1	14.6	3.9
6211	Physician offices	1,785	1.2	6.0	20.9	25.2	27.8	14.3	4.5
6212	Dental offices	852	2.8	8.8	21.4	24.5	24.5	13.8	4.0
6213	Offices of other health practitioners	553	1.9	7.3	21.1	22.4	25.0	16.9	5.4
6214	Outpatient care centers	919	1.3	7.4	23.4	22.1	27.5	15.5	2.7
6216	Home health care services	928	1.2	5.6	18.9	28.5	25.3	15.9	4.5
6219	Other ambulatory health care services	1,096	1.2	7.3	25.4	26.1	24.9	12.5	2.3
622	Hospitals	5,712	0.8	7.0	21.4	25.6	27.7	14.9	2.5
623	Nursing and residential care facilities	2,507	4.5	10.0	20.0	21.9	24.5	15.0	4.0
6231	Nursing care facilities	1,807	4.7	9.5	20.1	22.3	24.9	14.6	3.8
6232, 6233, and 6239	Residential care facilities (without nursing)	700	4.1	11.2	20.0	20.6	23.6	15.7	4.8
62, except 624	Health care	14,352	1.7	7.5	21.4	24.7	26.4	14.8	3.4
	All industry sectors (16 years and over)	144,427	4.2	9.6	21.5	23.9	23.6	13.4	3.7

Source: From Current Population Survey, NIOSH IST Data Mart Query, Query 1: column variable, age; row variable, NORA sector (primary job) and Query 2: column variable, age; row variable, industry code (primary job), <http://isx-morg1/dsr/IST/ISTDM2/cps/cps estimates results2.aspx>

Note: Values may not sum to the totals due to rounding.
^a NAICS, U.S. Census Bureau, www.census.gov/epcd/www/naics.html
^b Excludes medical and diagnostic laboratories (NAICS 6215); data are unavailable.

care services (27%) employ the largest percentages of any industry group within Health Care, while dental offices (3.6%) and offices of other health care practitioners (3.2%) employ the smallest percentages. Hispanics represent about 8.7% (1.2 million) of the workforce in Health Care (Table 2.9). Ambulatory health care services employ the largest number of Hispanics of any Health Care subsector (0.61 million), followed by hospitals (0.43 million). Home health care services (16.7%) and outpatient care centers (11.0%) employ the greatest percentages of any Health Care industry group. Asians represent over 6.3% of the workforce in Health Care, with an employment of 0.90 million (Table 2.9). Hospitals employ the greatest percentage of Asians of any Health Care subsector (7.0%); ambulatory health care services employ the largest number (0.4 million) slightly more than in hospitals. Percent distribution of employed persons in Health Care by age is provided for each of the three Health Care subsectors and four digit constituent industries, where available (Table 2.10). When compared to all industries, percents within each of the 7 age groups were very similar, with exception of the 16–19 age group where the industry average was about 2.5 times that in Health Care. Among the three Health Care subsectors, the highest percent employed within the 16–19, 20–24, 55–64, and 65 and over age groups were for nursing and residential care facilities; in the 35–44 and 45–54 age groups, hospitals employed the largest percent; and in the 25–34 age group, ambulatory health care services employed the

largest percent. When focusing on industries (four digit codes), nursing care facilities and residential care facilities without nursing had the highest percent distributions for young workers (16–19 and 20–24 age groups), while offices of other health care practitioners had the highest percent distributions for older workers (55–64 and 65 and over).

By Occupation

Table 2.11 presents sex, race, and ethnicity demographics of the top 20 Health Care occupations with the largest number of workers. For 16 of these occupations, the percents of women are higher than the industry average. Dental hygienists represent the highest concentration of women (98.6%), whereas dentists represent the lowest (22.6%). Registered nurses account for the largest number of women of any health care occupation (2.5 million).

TABLE 2.11 Percent Distribution of Women, Blacks, Hispanics, and Asians in 20 Largest Occupations in Health Care, 2006

Occupation	Total Employed (in Thousands)	Percent of Total			
		Women	Black or African American	Hispanic or Latino	Asian
Registered nurses	2,529	91.3	10.9	4.2	7.5
Nursing, psychiatric, and home health aides	1,906	88.9	34.8	13.1	4.0
Physicians and surgeons	863	32.2	5.2	5.7	17.0
Personal and home care aides	703	87.3	22.4	14.9	5.8
Licensed practical nurses and licensed vocational nurses	556	94.2	23.2	7.0	3.1
Health diagnosing and treating practitioner support technicians	425	80.1	11.8	8.2	5.6
Clinical laboratory technologists and technicians	321	78.1	14.2	7.8	9.6
Diagnostic related technologists and technicians	281	72.9	7.5	6.3	2.9
Dental assistants	274	95.4	5.4	14.9	4.2
Pharmacists	245	48.9	6.0	5.6	19.5
Physical therapists	198	62.7	5.8	5.0	13.7
Dentists	196	22.6	3.1	4.3	11.4
Emergency medical technicians and paramedics	156	31.9	11.9	7.4	2.2
Dental hygienists	144	98.6	1.4	4.6	4.2
Speech language pathologists	114	95.3	8.1	3.6	1.4
Medical records and health information technicians	98	92.0	20.5	15.1	1.4
Dieticians and nutritionists	96	91.0	21.2	4.6	7.6
Respiratory therapists	85	66.0	15.3	6.2	4.6
Occupational therapists	78	90.3	3.1	2.0	4.7
Chiropractors	69	23.1	3.3	1.9	1.8
Total (16 years and older)	144,427	46.3	10.9	13.6	4.5

Source: From Current Population Survey (2006), Household Data Annual Averages, Table 11, Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity, <http://www.bls.gov/cps/cpsaat11.pdf>

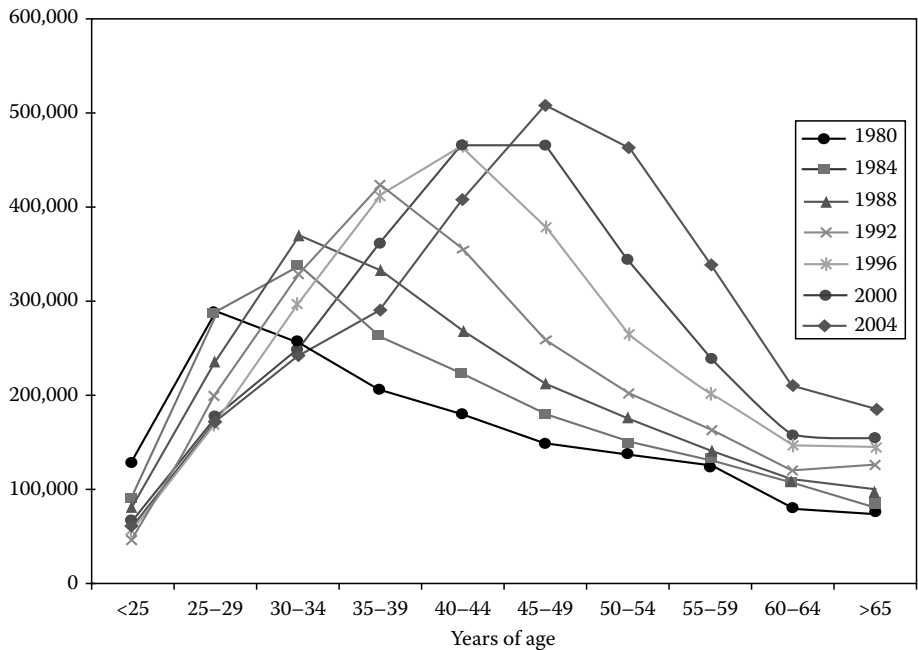
Note: Data for occupations with fewer than 50,000 employed are not published.

For half of the listed occupations, the percents of Blacks meet or exceed the industry average of 10.9% (Table 2.11). Nursing, psychiatric, and home health care aides represent the occupational group with the highest percentage (34.8%); dental hygienists comprise the lowest percentage (1.4%). Nursing, psychiatric, and home health aides account for the largest number of Blacks of any health care occupation (0.66 million).

The percents of Hispanics are higher than the industry average (13.6%) for only 3 of the 20 occupations, with medical records and health information technicians representing the highest concentration (15.1%). By comparison, chiropractors represent the lowest percentage (1.9%). Nursing, psychiatric, and home health aides account for the largest number of Hispanics of any health care occupation (0.25 million).

The percents of Asians are higher than and exceed the industry average of 4.5% for 11 of the top 20 occupations. Pharmacists represent the highest concentration of individuals of Asian decent (19.5%); medical records and health information technicians and speech language pathologists represent the lowest (1.4%). Registered nurses account for the largest number of Asians of any health care occupation (0.19 million).

Very little data are available on age distribution for most of the health care occupations listed in Table 2.11, with the exception of registered nurses. Findings from a 2004 national sample survey¹ show continual movement to more registered nurses in older age groups and a general decline in the numbers of registered nurses in younger age groups (Figure 2.1). Based on data from seven quadrennial surveys conducted from 1980 to 2004, the average age of the registered nurse population continued to climb, increasing to 46.8 years of age in 2004 compared to 44.3 years in 1996. The largest age group of registered nurses in 1980 was 25–29 years of age, 35–39 years in 1992, 40–44 years in 1996, 45–49 years in 2000, and 45–49 years in 2004. By contrast, the numbers of registered nurses in the two youngest age groups (less than 25 and 25–29 years of age) continued to decline over this 24 year period.



Note: The total numbers in each survey, across age ages, may not equal the estimated total of all registered nurses due to incomplete information provided by respondents. Only those who provided age information are included in the calculations used for this chart.

FIGURE 2.1 Age distribution of registered nurse population, 1980–2004.

Reference

1. The Registered Nurse Population: Findings from the 2004 National Sample of Registered Nurses. Health Resources and Services Administration, U.S. Department of Health and Human Services. <http://bhpr.hrsa.gov/healthworkforce/rnsurvey04/2.htm>

Burden of Injury and Illness in Health Care as Documented by Surveillance Systems

James M. Boiano, John P.E. Sestito, Sara E. Luckhaupt, Cynthia F. Robinson, and James T. Walker

This section presents an overview illustrated by charts and tables that describe the national magnitude and trends of occupational injuries, illnesses, and fatalities in the HCSA sector,* as documented by various federal and state-based surveillance systems. The data focus on the three Health Care subsectors (i.e., ambulatory health care services, hospitals, and nursing and residential care facilities), although data for social assistance are also provided, where available. Data are presented for predominant health and safety hazards and issues including sprains and strains, overexertion/repetitive trauma, falls on same level, assaults and violent acts, sharps injuries (SIs), and infectious disease. Significantly elevated causes of death for each of the three Health Care subsectors and for the largest health care occupations are also provided.

Bureau of Labor Statistics National Surveillance Systems Data

National statistics on occupational injuries, illnesses, and fatalities are compiled by the Bureau of Labor Statistics (BLS) in conjunction with participating state agencies. National estimates of the numbers and rates of illnesses and injuries are compiled from the annual Survey of Occupational Injuries and Illnesses (SOII), which is based solely on private industry employer's OSHA logs.¹ The SOII exclude self-employed persons, public sector workers, and workers employed on small farms, representing 22% of the U.S. workforce, and thus may underestimate the true prevalence of injuries, illnesses, and fatalities. Numbers of cases and incidence rates are reported by year with 2005 being the most recent year data are presented.

For each recordable case, employer's are required to complete OSHA Form 300 (Log of Work-Related Injuries and Illnesses), OSHA Form 301 (Injuries and Illnesses Incident Report), and OSHA Form 300A (Summary of Work-Related Injuries and Illnesses).² Collectively, these forms are used to develop a picture of the extent and severity of work-related incidents. In Form 300, employers must record information about every work-related death and about every significant work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. Employers must also classify the case as either an injury or one of the following types of illness: skin disorder, respiratory condition, poisoning, hearing loss, or all other illnesses. In Form 301, employers must record information about the employee (name, address, date of birth, gender, etc.), information about the treating health care professional, and information about the case (date and time of incident, job activity at time of incident, part of body affected, object or substance that harmed the employee, and date of death if employee died). In Form 301A, employers must provide yearly totals for the following: deaths, total cases with days away from work, total cases with job transfer or restriction, and total other recordable cases—total days away from work, total days of job transfer or restriction, injuries, or one of the five aforementioned illness categories. Establishment information including name, industry code, annual average number of employees, and total hours worked by all employees in the last year is also required.

* 2002 NAICS code 62 (see Chapter 1 for more information on NAICS codes for HCSA sector).

The circumstances of each case are classified based on the BLS Occupational Injury and Illness Classification Manual.³ The survey uses four case characteristics to describe each incident that led to an injury or illness that led to one or more days away from work. These characteristics include the following:

- *Nature*: The physical characteristics of the disabling injury or illness, such as lacerations, fractures, or sprains/strains
- *Part of body affected*: Part of body directly linked to the nature of the reported injury or illness, such as back, finger, or eye
- *Event or exposure*: The manner in which the injury or illness was produced or inflicted by the source, such as falls, overexertion, or repetitive motion
- *Source*: The object, substance, exposure, or bodily motion that directly produced or inflicted the disabling condition, such as chemicals, vehicles, or machinery

In this section, numbers of cases and incidence rates are reported by year, with 2005 being the most recent year where data are presented. These estimates are provided for the HCSA sector as a whole, by three digit subsector and four digit industry (where available), with comparisons to all private industries and service-providing industries.

National statistics on fatal occupational injuries are from another BLS surveillance system called the Census of Fatal Occupational Injuries (CFOI). Unlike the SOII, the CFOI is considered a complete census that uses multiple data sources for tracking traumatic workplace fatalities resulting from intentional and unintentional injuries.⁴

Total Nonfatal Occupational Injuries and Illnesses

Of the 4.2 million nonfatal occupational injuries and illnesses reported by private industry employers in 2005, the HCSA sector represents the second largest share of injuries and illnesses (668,000 or 15.9% of total recordable cases)³ (Figure 2.2). In fact, three of the four HCSA subsectors—hospitals, nursing and residential care facilities, and ambulatory health care services—are ranked 1st, 2nd, and 12th, respectively, and are among the 14 industries with 100,000 or more injuries and illnesses in 2005 (Table 2.12). Hospitals have led this group for the past 3 years, ever since NAICS-based tabulations began in 2003.⁵

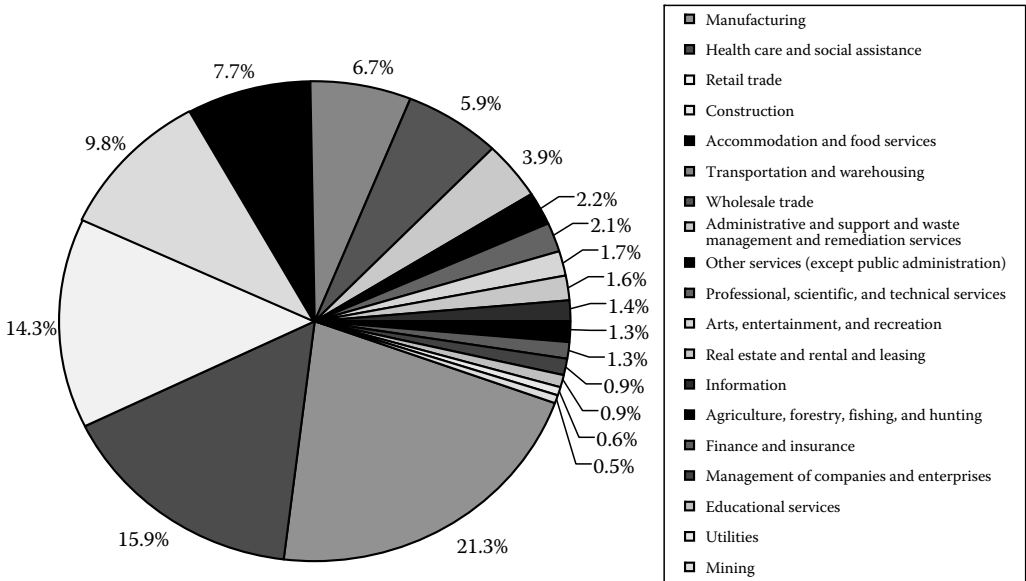


FIGURE 2.2 Percent distribution of nonfatal occupational injuries and illnesses by industry sector, 2005.

TABLE 2.12 Number of Cases and Incidence Rate of Nonfatal Occupational Injuries and Illnesses for Industries with 100,000 or More Cases, 2005

2002 NAICS Code ^a	Industry ^b	Total Cases (in Thousands)	Incidence Rate ^c
622	Hospitals	281.51	8.1
623	Nursing and residential care facilities	209.1	9.1
452	General merchandise stores	147.2	6.7
336	Transportation equipment manufacturing	146.8	8.3
561	Administrative and support services	141.1	3.4
332	Fabricated metal product manufacturing	121.8	8.0
423	Merchant wholesalers (durable goods)	119.5	4.1
2382	Building equipment contractors	117.8	6.7
311	Food manufacturing	114.2	7.7
7221	Full-service restaurants	111.7	3.9
44511	Supermarkets and other grocery (except convenience) stores	110.7	6.5
621	Ambulatory health care services	110.6	2.8
424	Merchant wholesalers (durable goods)	110.0	5.7
7222	Limited-service eating places	103.3	4.1
	Total (private industry ^d)	4,214.2	4.6

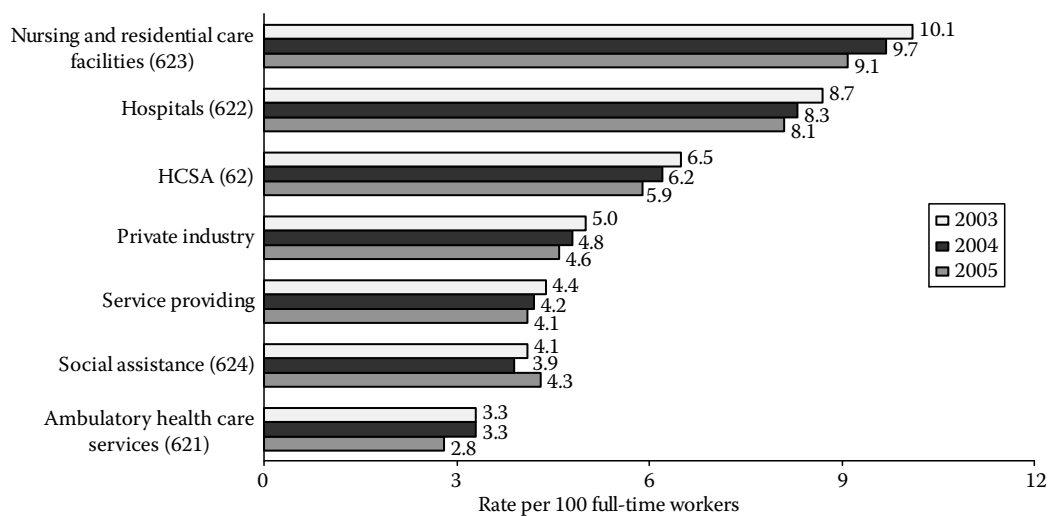
Source: From Bureau of Labor Statistics, <http://www.bls.gov/news.release/osh.t04.htm>
Note: Bold indicates health care industry.
^a NAICS, U.S. Census Bureau, www.census.gov/epcd/www/naics.html
^b Totals include data for industries not shown separately.
^c The incidence rates represent the number of injuries and illnesses per 100 full-time workers.
^d Excludes farms with fewer than 11 employees.

Occupational illnesses account for only 7% of all total reportable injury and illness cases in the HCSA sector and was not different from private industry as a whole. Compared to injuries, illnesses are often difficult to relate to the workplace and more likely to be underreported due to the fact that many work-related diseases are associated with long latency periods (e.g., cancers, chronic respiratory ailments, etc.). The issue of underreporting is discussed later in section.

Figure 2.3 compares incidence rates of nonfatal occupational injuries and illnesses for the HCSA sector and by subsector for 2003–2005 to those for private industry and to service-providing industries. In 2005, the incidence rate of injuries and illnesses in the HCSA sector was 5.9 cases per 100 full-time workers, nearly 1.3 and 1.4 times higher than in private and service-providing industries, respectively. Injury and illness incidence rates in the sector were driven by nursing and residential facilities and hospitals. These rates declined for all HCSA subsectors, as well as in private and service-providing industries, for each year since 2003 (when NAICS-based tabulations began), with the exception of the rate in the social assistance subsector that increased from 2004 to 2005.

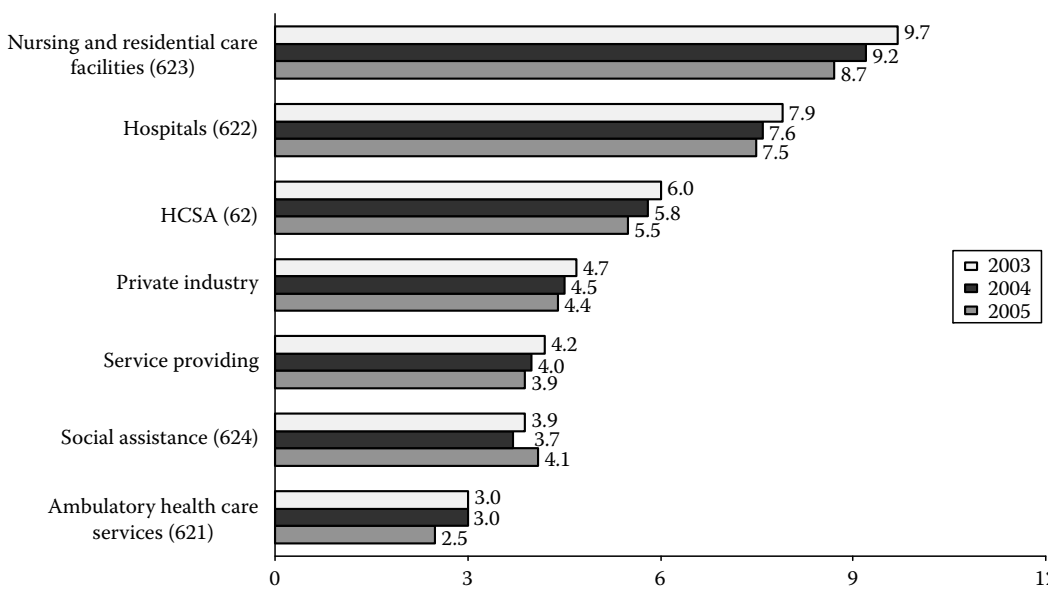
Total Nonfatal Occupational Injuries

In 2005, the overall incidence rate of nonfatal occupational injuries for the HCSA sector was 5.5 cases per 100 full-time workers, compared to 4.4 and 3.9 cases per 100 full-time workers in the private and service-providing industries, respectively (Figure 2.4). The number of nonfatal injuries for this sector (624,000) accounted for 15.7% of the total number of injury cases in private industry.⁶ Incidence rates declined for all HCSA subsectors, as well as in private and service-providing industries, for each year since 2003, with the exception of the rate in the social assistance subsector that increased from 2004 to 2005



Note: NAICS codes in parentheses follow industry sector name.

FIGURE 2.3 Incidence rates of nonfatal occupational injuries and illnesses, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table 1, Incidence rates for nonfatal occupational injuries and illnesses by industry and case type: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1619.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1487.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1355.pdf>)



Note: NAICS codes in parentheses follow industry sector name.

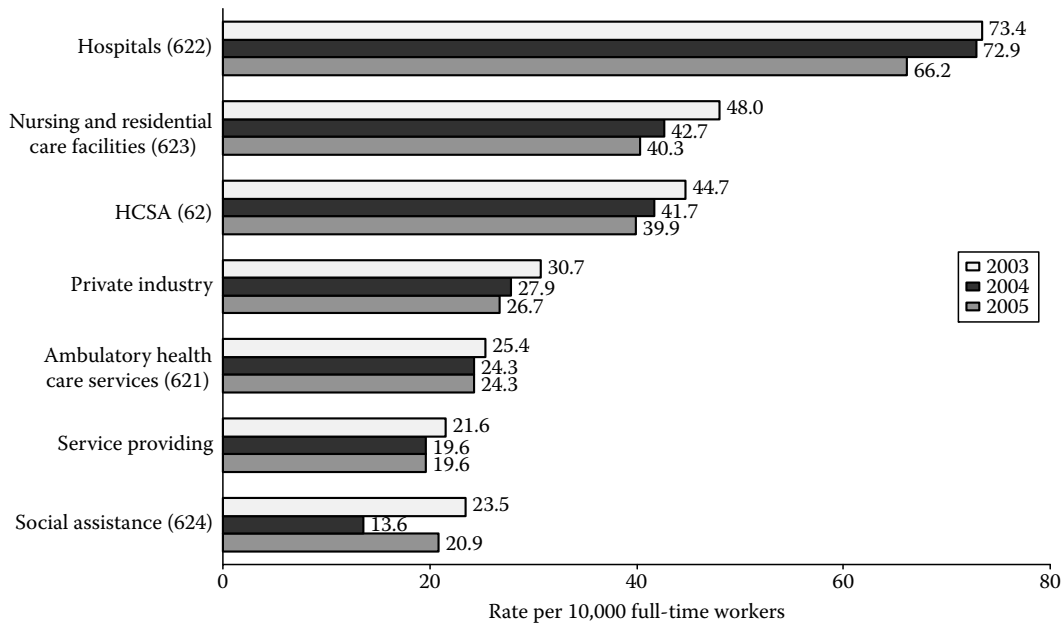
FIGURE 2.4 Incidence rates of nonfatal occupational injuries, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table SNR05, Incidence rate and number of nonfatal occupational injuries by industry, private industry, 2003–2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1611.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1479.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1347.pdf>)

2005. Nursing and residential care facilities had the highest incidence rate (8.7 cases per 100 full-time workers) with nearly 200,000 injury cases, followed by hospitals with an incidence rate of 7.5 and the highest number of injury cases (259,000) among the four subsectors (Figure 2.4).⁶ These two subsectors accounted for nearly three-quarters of the total injury cases for the sector.

Nonfatal Occupational Illnesses

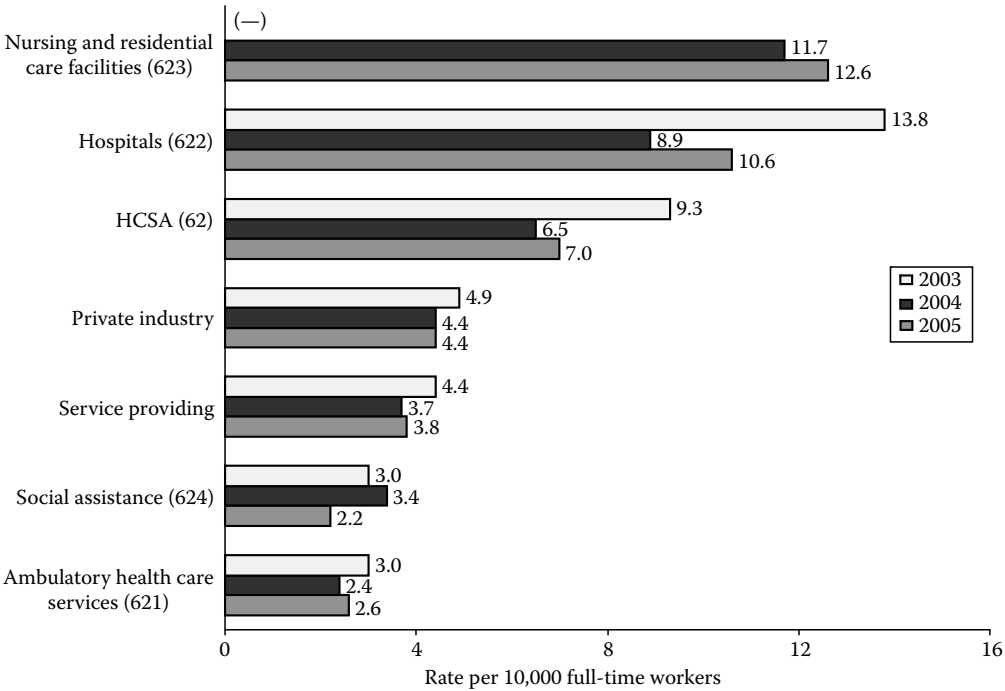
In 2005, the incidence of nonfatal occupational illnesses for the HCSA sector was 39.9 cases per 10,000 full-time workers, compared to 26.7 and 19.6 cases in the private and service-providing industries, respectively (Figure 2.5).⁷ The number of nonfatal illnesses for this sector (45,000) accounted for almost 20% of the total number of illness cases in private industry.⁸ Incidence rates declined for all HCSA subsectors, as well as in private and service-providing industries for each year since 2003, with the exception of social assistance and ambulatory health care services whose rates increased and remained unchanged from 2004 to 2005, respectively. In 2005, hospitals had the highest incidence rate (66.2 cases per 10,000 full-time workers) and number of reported cases (22,900) among the four subsectors. Nursing and residential care facilities accounted for the second highest incidence rate (40 cases per 10,000 full-time workers) and the third highest number of reported cases (9,200) behind ambulatory health care services. Hospitals accounted for over half of the 45,000 total illness cases for the sector.⁸

In 2005, nonfatal occupational skin diseases and disorders and respiratory conditions represented the most frequently reported illness categories in HCSA, with overall incidence rates of 7.0 and 5.2 cases, respectively, per 10,000 full-time workers (Figures 2.6 and 2.7). By comparison, incidence rates



Note: NAICS codes in parentheses follow industry sector name.

FIGURE 2.5 Incidence rates of nonfatal occupational illnesses, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table SNR08, Incidence rates of nonfatal occupational illness by industry and category of illness, private industry, 2003–2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1614.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1482.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1350.pdf>)



Note: NAICS codes in parentheses follow industry sector name.
(—) No publishable BLS data.

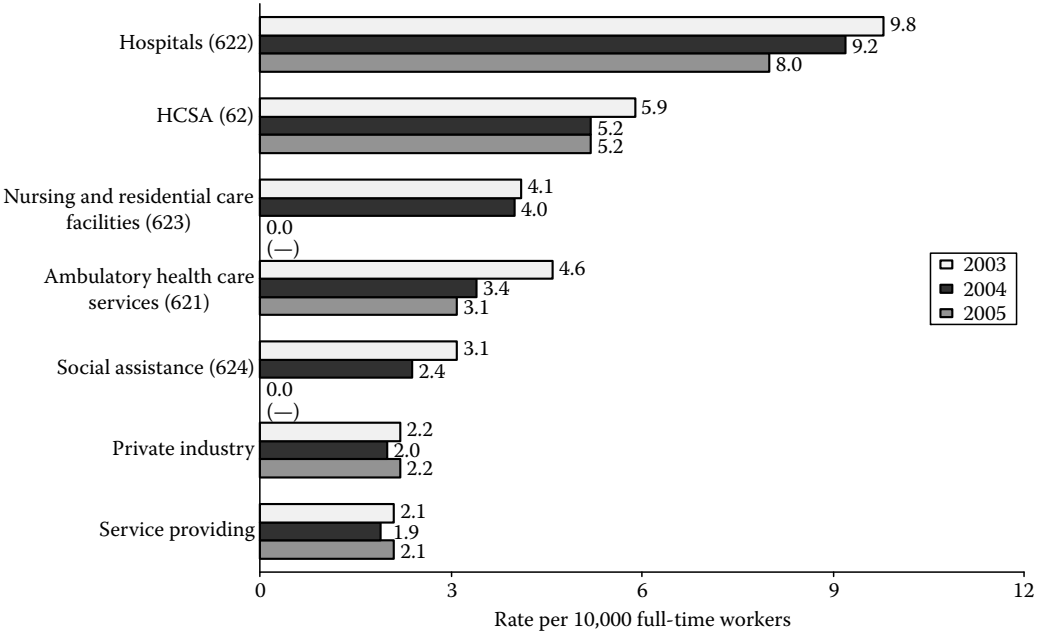
FIGURE 2.6 Incidence rates of nonfatal occupational skin diseases or disorders, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table SNR08, Incidence rates of nonfatal occupational illness by industry and category of illness, private industry, 2003–2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1614.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1482.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1350.pdf>)

in private industry were 4.4 and 2.2, respectively.⁷ Eighty percent of the illness cases involving skin disorders and respiratory conditions were reported in nursing and residential care facilities and hospitals. Nursing and residential care facilities had the highest incidence rate (12.6) and second highest number of skin disease cases (2900) among the subsectors. Hospitals accounted for the second highest incidence rate (10.6) and the highest number of skin disease cases (3700). Hospitals had the highest incidence rate (8.0) and number of cases (2800) of nonfatal respiratory conditions.

The incidence rate of nonfatal occupational poisonings in the HCSA sector was 0.2 cases per 10,000 workers in 2005. The social assistance subsector had the highest incidence rate, four times higher than the HCSA sector average and the rate in 2004. The incidence rate for all other illnesses (primarily repetitive trauma cases) was 27.4 cases per 10,000 full-time workers, accounting for nearly 70% of the total illness cases in the sector (Figure 2.8).⁸ Hospitals had an incidence rate of 47.3, nearly three times higher than in private industry, with over half of the “all other” illness cases for the sector.⁸

Nonfatal Occupational Injuries and Illnesses Involving Days away from Work

Of the 4.2 million nonfatal occupational injuries and illnesses reported by private industry employers in 2005, 1.2 million (28%) involved one or more days away from work.⁹ The HCSA sector accounted for 175,900 (14.2%) of these 1.2 million cases. Within HCSA, health care accounted for 154,940 (88%) of the



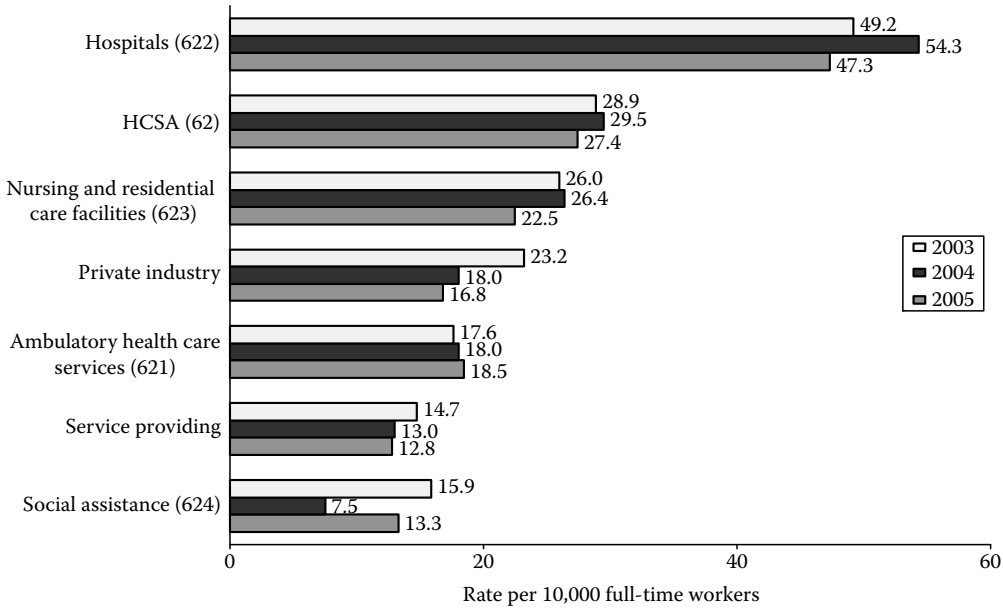
Note: NAICS codes in parentheses follow industry sector name.
(—) No publishable BLS data.

FIGURE 2.7 Incidence rates of nonfatal occupational respiratory conditions, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table SNR08, Incidence rates of nonfatal occupational illness by industry and category of illness, private industry, 2003–2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1614.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1482.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1350.pdf>)

175,900 cases, and social assistance the remainder (20,960 or 12%).¹⁰ Nursing and residential care facilities (66,620 cases) and hospitals (62,930 cases) accounted for over 73% of the total number of injury and illness cases involving days away from work.

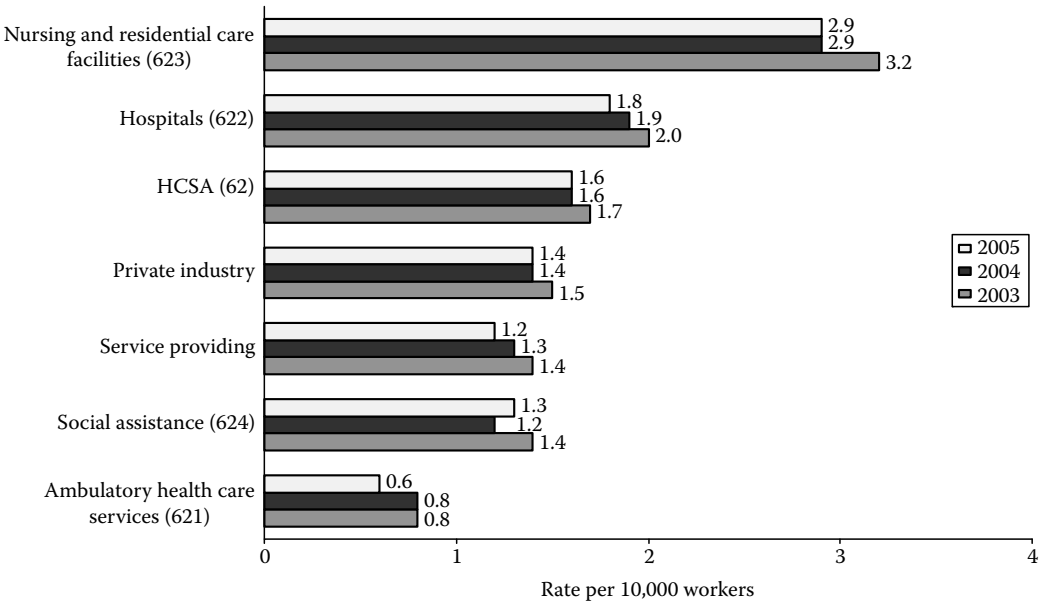
Figure 2.9 compares incidence rates of selected nonfatal occupational injuries and illnesses involving days away from work for the HCSA sector as a whole and by subsector for 2003–2005 to those for all private industry and to service-providing industries. In 2005, the incidence rate for the HCSA sector was 1.6 cases per 10,000 full-time workers, slightly higher than in private and service-providing industries. These data show that about one in four of the injury and illness cases involves days away from work. Nursing and residential care facilities and, to a lesser extent, hospitals were primary drivers for the increased incidence rates for the sector.

Cases involving days away from work are typically characterized by the nature of the injury or illness, the part of body affected, the source that caused the injury or illness, or the event that leads to exposure resulting in illness or injury. In 2005, sprains and strains (82.3 cases per 10,000 workers) were the most likely type of injury or illness in HCSA, nearly 1.5 times more likely to occur among workers in HCSA than in all private industry and about 5 times more likely than the next highest category of soreness and pain (Figure 2.10). The part of the body most affected was the trunk (66.8 cases per 10,000 workers), with an incidence rate nearly 1.5 times higher than in private industry, followed by lower extremities, upper extremities, and then multiple body parts (Figure 2.11). The health care patient (47.5 cases per 10,000 workers) was the most likely source of injury or illness for the health care worker, followed by floor/walkways/ground surfaces, and worker motion/position (Figure 2.12). Overexertion, falls on the same level, contact with object/equipment, and assaults/violent acts represent the top events or exposures leading to injury or illness in the sector (Figure 2.13).



Note: NAICS codes in parentheses follow industry sector name.

FIGURE 2.8 Incidence rates of other nonfatal occupational illnesses, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table SNR08, Incidence rates of nonfatal occupational illness by industry and category of illness, private industry, 2003–2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1614.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1482.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1350.pdf>)



Note: NAICS codes in parentheses follow industry sector name.

FIGURE 2.9 Incidence rates of nonfatal occupational injury and illness cases involving days away from work, HCSA sector and private industry, 2003–2005. (From Bureau of Labor Statistics, Table R8, Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by industry and selected events or exposure leading to injury and illness, 2003–2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1664.pdf>, 2004 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1518.pdf>, and 2003 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1386.pdf>)

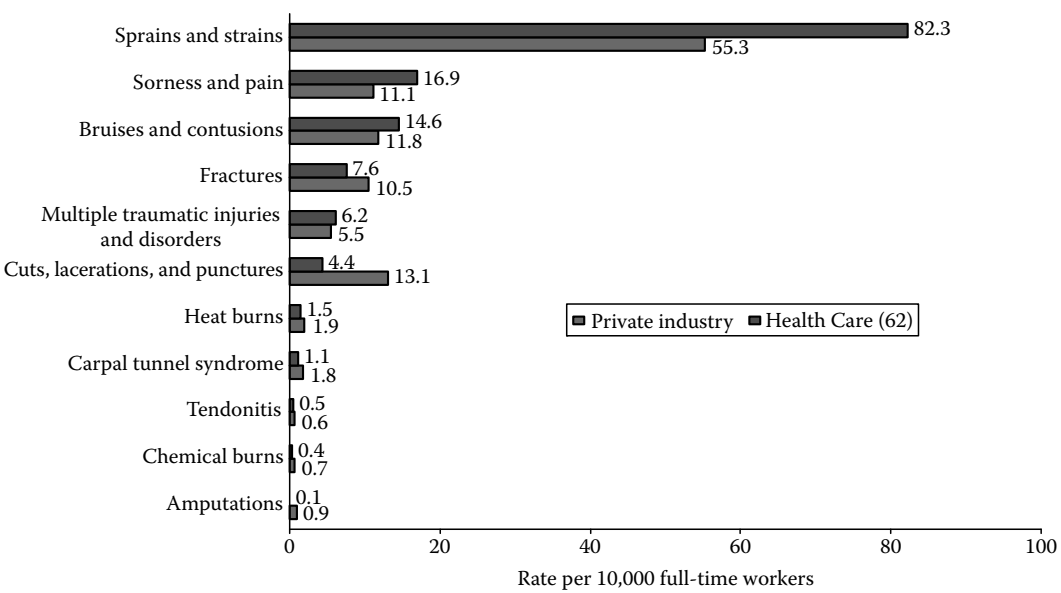
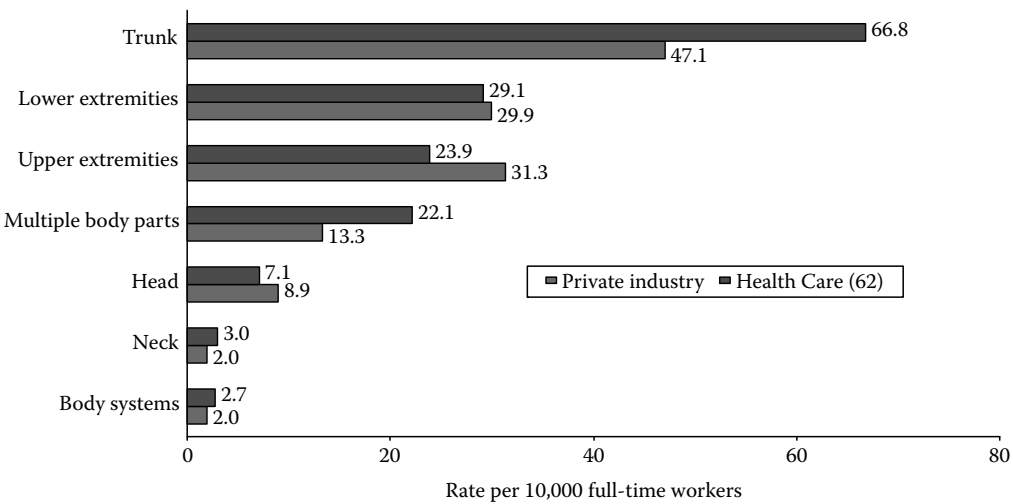
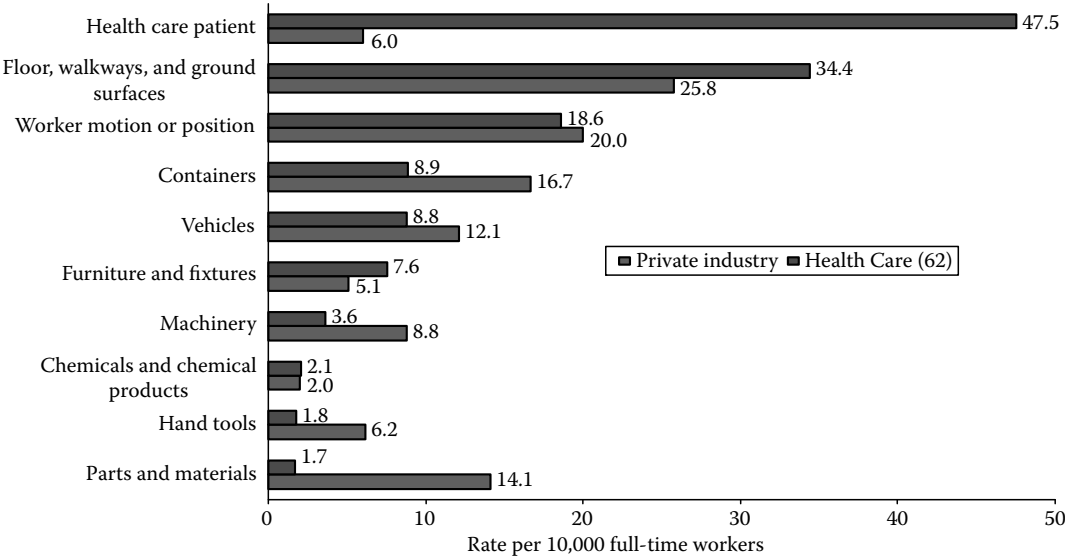


FIGURE 2.10 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work by selected nature of injury or illness, HCSA sector (62)* and private industry, 2005. (* denotes NAICS codes in parentheses follow industry sector name.) (From Bureau of Labor Statistics, Table R5, Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by selected natures of injury or illness, 2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1661.pdf>)



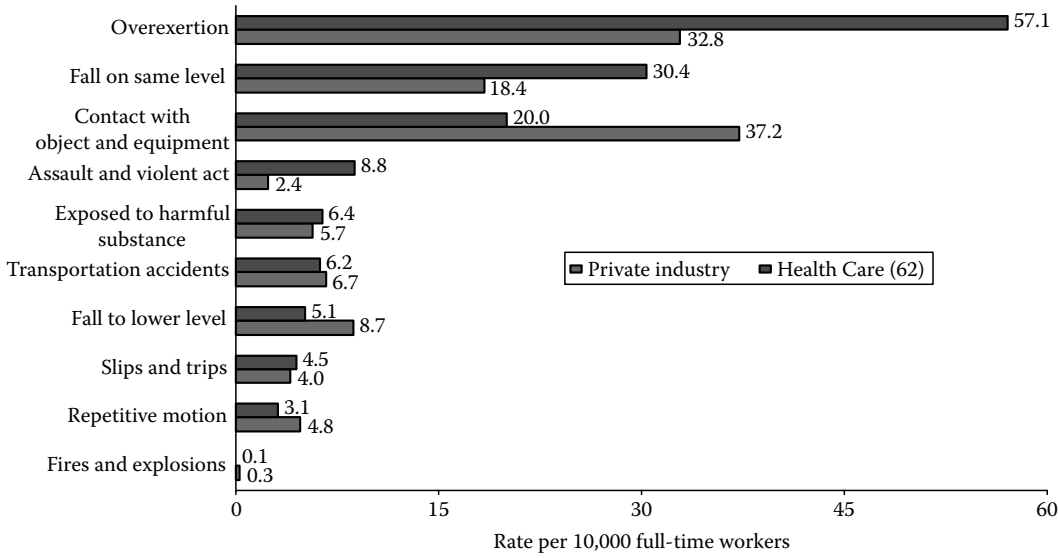
Note: NAICS code in parentheses follow industry sector name.

FIGURE 2.11 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work by selected parts of body affected, HCSA sector and private industry, 2005. (From Bureau of Labor Statistics, Table R6, Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by selected parts of body affected by injury or illness, 2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1662.pdf>)



Note: NAICS code in parentheses follow industry sector name.

FIGURE 2.12 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work by selected sources of injury or illness, HCSA sector and private industry, 2005. (From Bureau of Labor Statistics, Table R7, Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by industry and selected sources of injury or illness, 2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1663.pdf>)



Note: NAICS code in parentheses follow industry sector name.

FIGURE 2.13 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work by selected events of exposures leading to injury or illness, HCSA sector and private industry, 2005. (From Bureau of Labor Statistics, Table R7, Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by industry and selected events of exposures leading to injury or illness, 2005: 2005 data = <http://www.bls.gov/iif/oshwc/osh/case/ostb1664.pdf>)

The average incidence rate for assaults/violent acts in the HCSA sector (8.8 cases per 10,000 workers) was nearly four times higher than in all private industry.

In 2005, nursing and residential care facilities experienced the highest incidence rates (per 10,000 workers) for illnesses and injuries involving days away from work in the sector for

- Musculoskeletal disorders (MSDs) with an incidence rate of 131.4 cases, followed by other ambulatory health care services (89.0) and hospitals (82.7)¹¹
- Overexertion including lifting with an incidence rate of 122.8, followed by other ambulatory health care services (90.2) and hospitals (71.9)¹²
- Falls on the same level with an incidence rate of 56.5, followed by social assistance (34.3) and hospitals (30.1)¹²
- Personal assaults and violent acts with an incidence rate of 20.1, followed by social assistance (9.7) and outpatient care centers (9.5)¹²

Incidence rates for MSDs, overexertion, falls on the same level, and personal assaults and violent acts in nursing and residential care facilities were 3.2, 3.7, 3.1, and 12.5 times higher in HCSA, respectively, than in private industry and 1.8–2.4 times higher than the sector average.^{11,12}

In 2005, home health care services experienced the highest incidence rates (per 10,000 workers) of any one industry in the sector for

- Falls to lower level with an incidence rate of 10.9 cases, followed by nursing and residential care facilities (7.7) and social assistance (7.3)¹²
- Transportation (highway) accidents with an incidence rate of 22.4, followed by other ambulatory health care services (20.9) and social assistance (11.9)¹²

Major Injuries/Illnesses, Exposures, and Sources

Figures 2.14 through 2.18 present incidence rates of predominant lost workday occupational injuries and illnesses in Health Care for 2003–2005, including sprains and strains; overexertion/repetitive motion injuries; back injuries; slips, trips, and falls; and assaults and violent acts. Overall, for each of these injuries, illnesses, and exposures, nursing and residential care facilities experienced the highest incidence rates, followed by hospitals and ambulatory health care services. With the exception of injuries due to assaults and violent acts, the incidence rates for injuries, illnesses, and exposures showed similar trends in magnitude across the Health Care subsectors when compared to private industry: about 2–4 times higher for nursing and residential care facilities, 1.2–2 times higher for hospitals, and less than half for ambulatory health care services (Figures 2.14 through 2.17). Incidence rates for injuries and illnesses involving assaults/violent acts were about 10 and 4 times higher in nursing and residential care facilities and hospitals than in private industry, respectively, and were no different than private industry for ambulatory health care services (Figure 2.18). Incidence rates for the 3 year period were somewhat lower in 2005 when compared to 2003 for these outcomes/exposures, with the exception of slips, trips, and falls in nursing and residential care facilities that increased about 7%.

Incidence rates characterized by selected sources of injury and illness are presented by Health Care subsector for 2003–2005, with comparison to private industry, in Figures 2.19 and 2.20. For each source (i.e., health care patient, worker motion or position, and floor and ground surfaces), nursing and residential care facilities experienced the highest incidence rates, followed by hospitals and ambulatory health care services. The incidence rates for injuries associated with worker motion or position in ambulatory health care services showed marked declines from 2003 to 2005 (Figure 2.21). The rates in hospitals, by comparison, were similar and in 2005 slightly exceeded that in nursing and residential care facilities. Incidence rates for two of the three source categories (worker motion or position and floor and ground surfaces) showed similar trends in magnitude across Health Care subsectors when compared to

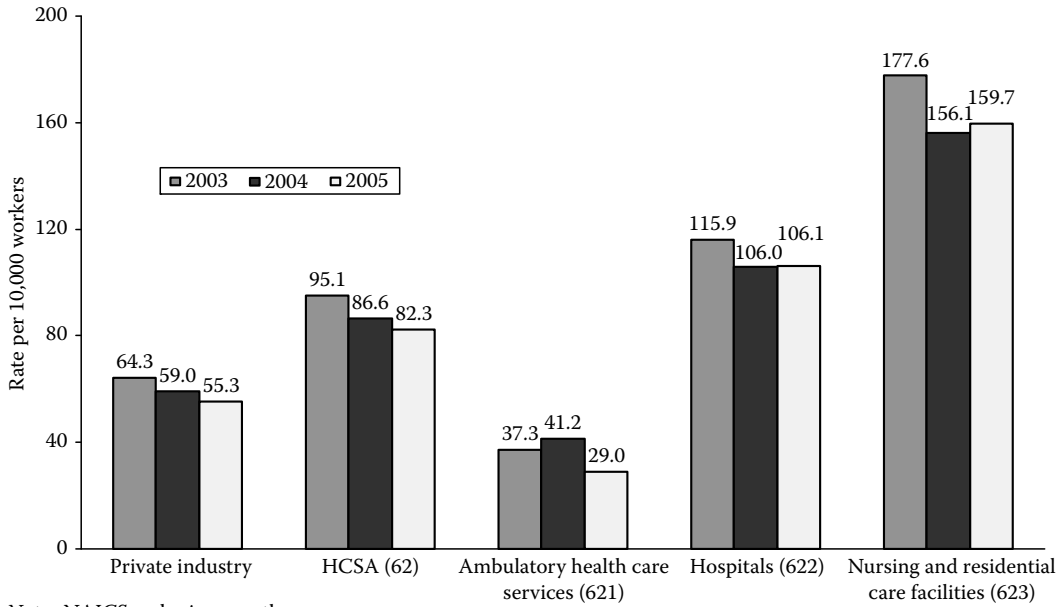


FIGURE 2.14 Incidence rates of nonfatal occupational sprains and strains involving days away from work, Health Care and private industry, 2003–2005.

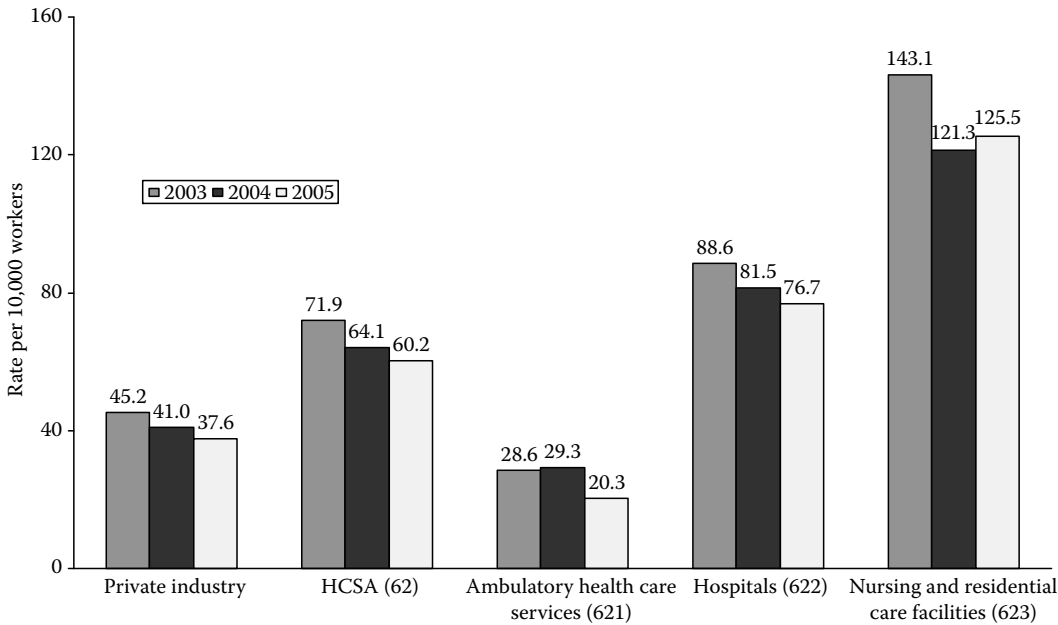


FIGURE 2.15 Incidence rates of nonfatal occupational overexertion and repetitive motion injuries and illnesses involving days away from work, Health Care and private industry, 2003–2005.

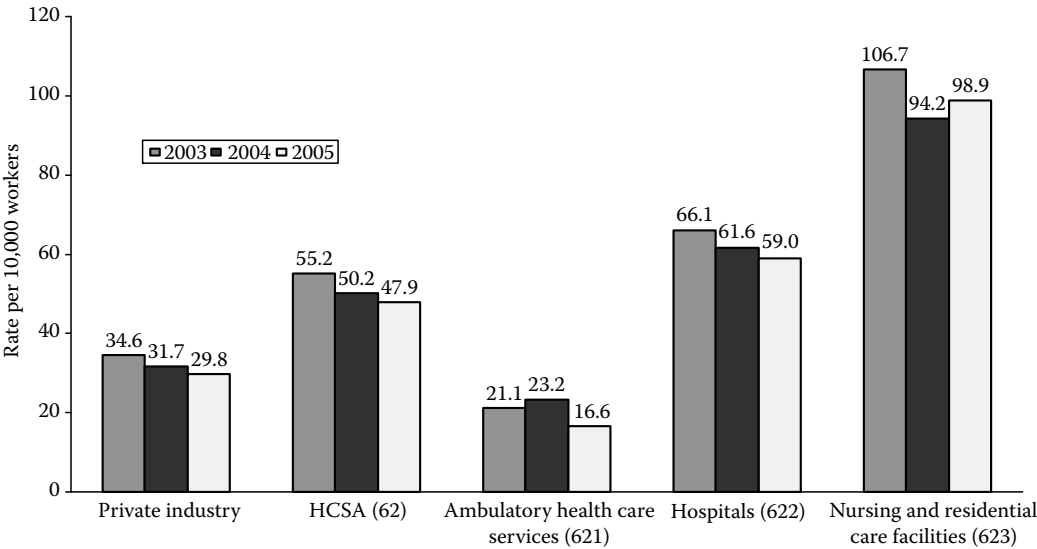


FIGURE 2.16 Incidence rates of nonfatal occupational back injuries involving days away from work, Health Care and private industry, 2003–2005. (NAICS codes in parentheses follow industry sector name.)

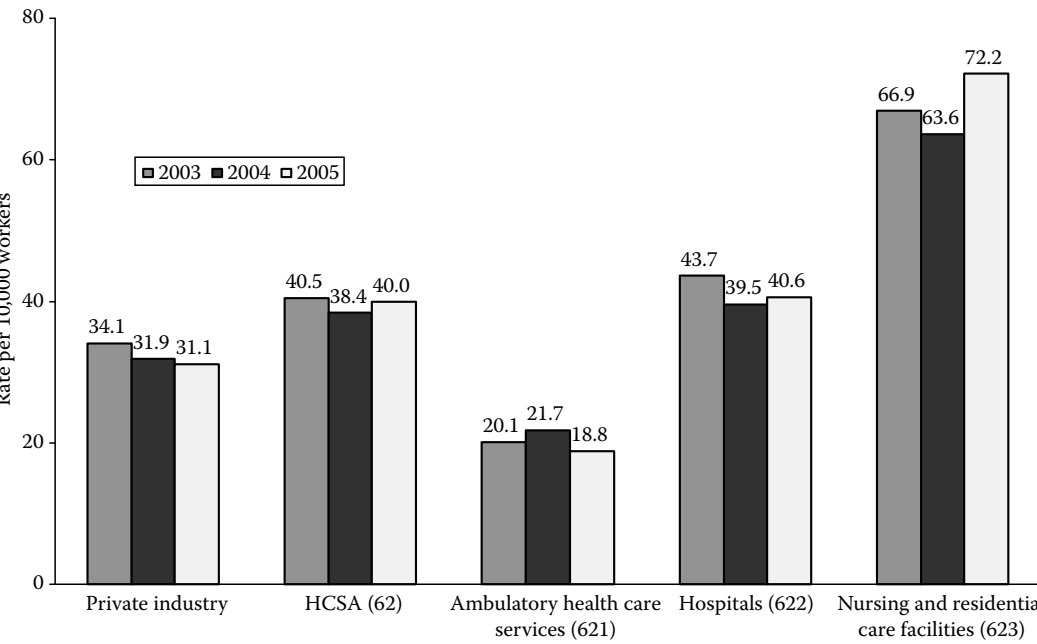


FIGURE 2.17 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work due to slips, trips, and falls, Health Care and private industry, 2003–2005. (NAICS codes in parentheses follow industry sector name.)

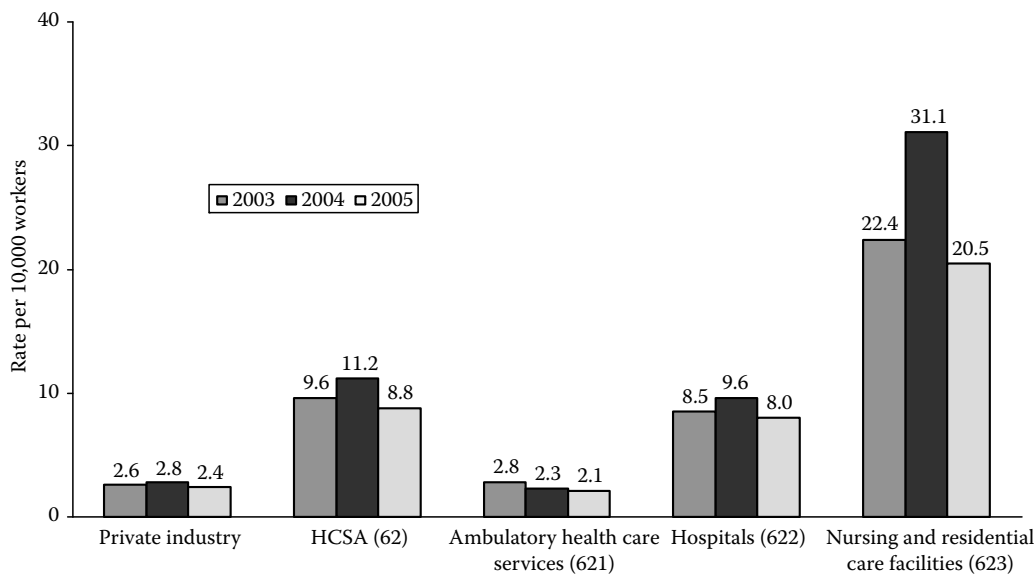


FIGURE 2.18 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work due to assaults and violent acts, Health Care and private industry, 2003–2005. (NAICS codes in parentheses follow industry sector name.)

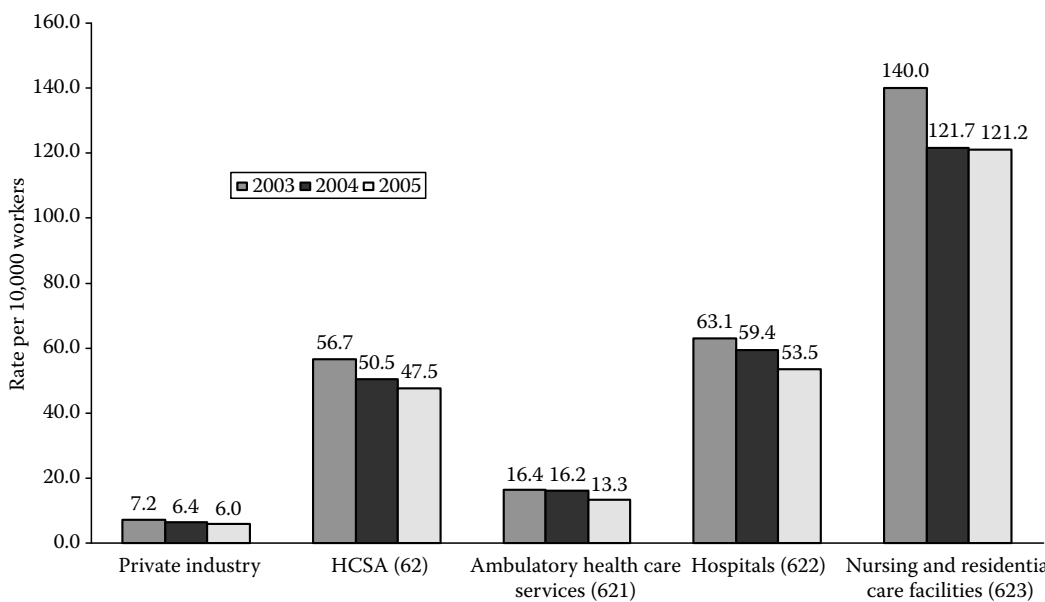


FIGURE 2.19 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work, health care patient as source, Health Care and private industry, 2003–2005. (NAICS codes in parentheses follow industry sector name.)

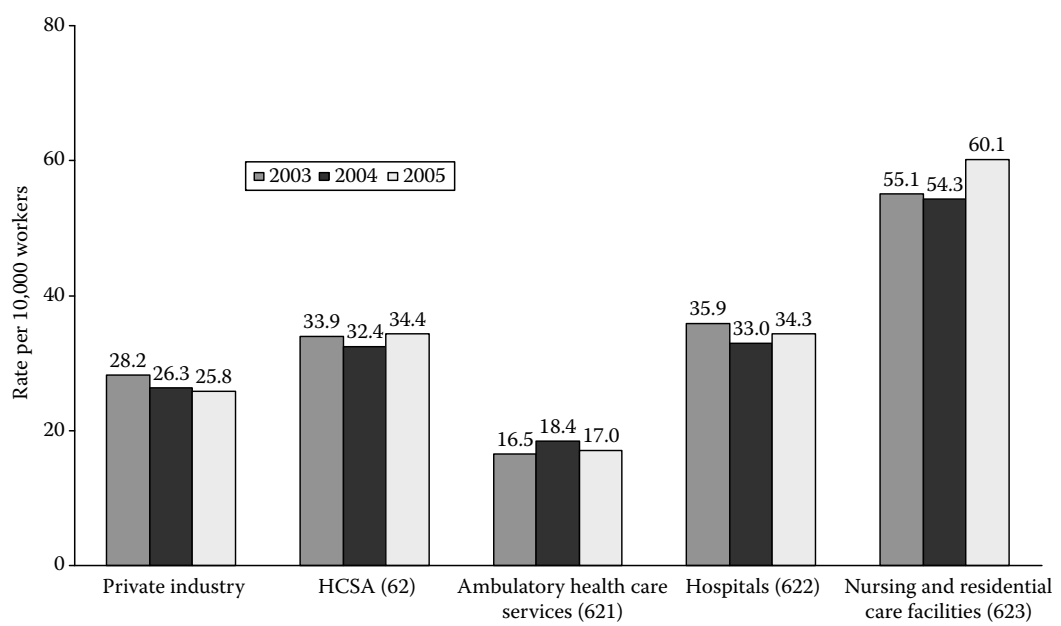


FIGURE 2.20 Incidence rates of nonfatal occupational injuries involving days away from work, floor and ground surfaces as source, Health Care and private industry, 2003–2005. (NAICS codes in parentheses follow industry sector name.)

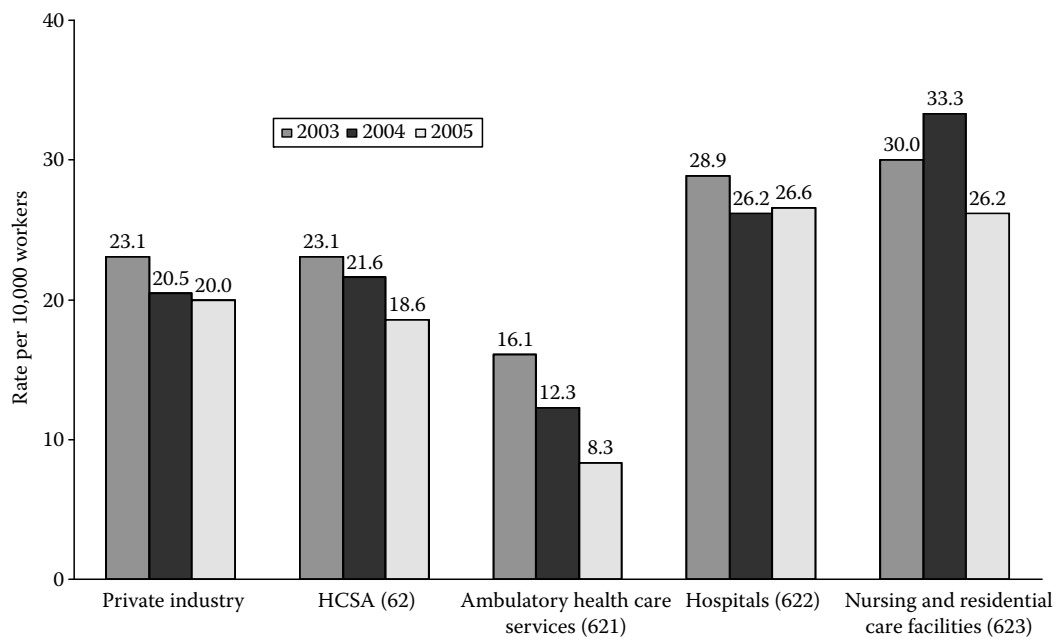


FIGURE 2.21 Incidence rates of nonfatal occupational injuries and illnesses involving days away from work, worker motion or position as source, Health Care and private industry, 2003–2005. (NAICS codes in parentheses follow industry sector name.)

private industry: about 2–3 times higher for nursing and residential care facilities, 1.2–1.3 times higher for hospitals, and 40%–60% less for ambulatory health care services (Figures 2.20 and 2.21). Incidence rates involving injuries where the health care patient was the source were about 20, 9, and 2 times higher in nursing and residential care facilities, hospitals, and ambulatory health care services, respectively, than in private industry, a finding directly attributable to the fact that patients are unique to Health Care (Figure 2.19).

Special Populations

This section provides data describing the distribution of nonfatal injuries and illnesses for selected special populations at risk within the HCSA sector (i.e., those workers who experience a disproportionate share of injury and disease due to sex, age, race, ethnicity, etc.).

The section focuses on women, young workers (16–19 year olds), minorities, and older workers (45 years and over). Reported figures are based on 2005 employment and injury and illness data.

Industry Level Data

Table 2.13 displays the 2005 percent distribution of nonfatal injury and illness cases involving days away from work by the sex, race, and ethnic origin of worker in the HCSA sector and private industry. Women experienced 80.7% of the lost workday injury and illness cases in this sector compared to 31%

TABLE 2.13 Percent Distribution of Nonfatal Injuries and Illnesses Involving Days away from Work by Industry, Sex, Race, and Ethnic Origin of Worker, 2005

2002 NAICS Code ^a	Industry	Total Cases	Percent of Nonfatal Injury and Illness Cases Involving Days away from Work			
			Women	Black or African American ^b	Hispanic or Latino ^b	Asian ^b
621	Ambulatory health care services ^c	25,390	84.2	17.6	7.7	1.1
6211	Physician offices	5,420	91.0	10.5	14.5	0.5
6212	Dental offices	1,010	100	—	—	—
6213	Offices of other health practitioners	900	96.7	30.9	7.1	—
6214	Outpatient care centers	4,380	75.8	29.9	4.2	0.2
6216	Home health care services	9,660	95.3	20.1	5.7	1.0
6219	Other ambulatory health care services	3,180	45.6	7.1	8.4	0.8
622	Hospitals	62,930	77.1	17.1	10.3	4.2
623	Nursing and residential care facilities	66,620	84.5	29.3	9.2	1.9
624	Social assistance	20,960	75.6	16.5	9.0	0.8
62	Health care and social assistance	175,900	80.7	23.0	9.6	2.4
	Total (private industry, 16 years and over)	1,234,680	33.7	11.8	19.0	1.5

Source: From Bureau of Labor Statistics, Table R39, <http://www.bls.gov/iif/oshwc/osh/case/ostb1695.txt> and Table R38, <http://www.bls.gov/iif/oshwc/osh/case/ostb1694.txt>

Notes: Dash (—) indicates data are unavailable. Because of rounding and data exclusion of nonclassifiable responses, data may not sum to the totals.

^a NAICS, U.S. Census Bureau, www.census.gov/epcd/www/naics.html

^b Includes women and men.

^c Excludes medical and diagnostic laboratories (NAICS 6215) where data is unavailable.

private industry. Available data by four-digit industry group reveal that women represented the minority of cases in only one industry, other ambulatory health care services. Overall, Blacks (both women and men) experienced 23% of the lost workday injury and illness cases, nearly twice that of their counterparts in private industry. Blacks accounted for over 29% of the cases in nursing and residential care facilities, and about 17% of the cases for each of the remaining three subsectors. Hispanics of both sexes experienced 9.6% of the lost workday injury and illness cases in the sector, about half of that of their counterparts in private industry. The distribution of cases among Hispanics across the four subsectors ranged from 7.7% to 10.3%, with the highest in hospitals. Asians of both sexes experienced 2.4% of the lost workday injury and illness cases in this sector, about 1.6 times that of their counterparts in private industry. The percent distribution of cases among Asians across the four subsectors ranged from 0.8% to 4.2%, with the highest percent of cases experienced in hospitals.

Table 2.14 displays the 2005 percent distribution of nonfatal injuries and illnesses involving days away from work, by age category of workers in the HCSA sector and private industry. In general, HCSA workers in the 16–19, 20–24, 25–34, and 35–44 age groups experienced lower percent of lost workday injury and illness cases than their counterparts in private industry. However, the reverse was true for workers aged 45 and over. When comparing the proportions of cases within each subsector to one another, workers in nursing and residential care facilities experienced the highest proportion of cases in the age groups of 16–19, 20–24, and 25–34. Workers in hospitals experienced the highest proportions in the age groups of 35–44, 45–54, and 55–64 and workers in social assistance experienced the highest proportions in the 65 and over age group.

TABLE 2.14 Percent Distribution of Nonfatal Injuries and Illnesses Involving Days away from Work by Industry and Age of Worker, 2005

2002 NAICS Code ^a	Industry	Total Cases	Percent of Nonfatal Injury and Illness Cases Involving Days away from Work by Age Group						
			16–19	20–24	25–34	35–44	45–54	55–64	65 and Over
621	Ambulatory health care services ^b	25,390	0.6	7.4	21.4	25.4	26.7	15.8	2.7
6211	Physician offices	5,420	1.1	3.2	15.6	30.0	36.5	11.6	1.9
6212	Dental offices	1,010	—	18.8	13.9	45.5	16.8	—	—
6213	Offices of other health practitioners	900	—	—	18.9	44.4	26.7	7.8	—
6214	Outpatient care centers	4,380	1.1	10.3	21.9	19.6	24.6	16.7	5.5
6216	Home health care services	9,660	0.3	5.8	17.2	23.1	29.0	21.7	2.9
6219	Other ambulatory health care services	3,180	—	12.9	47.8	18.9	10.7	8.5	1.2
622	Hospitals	62,930	0.8	6.5	18.8	26.7	29.0	16.4	1.7
623	Nursing and residential care facilities	66,620	3.4	12.1	25.1	24.8	22.5	10.1	2.0
624	Social assistance	20,960	1.7	9.8	20.7	21.5	27.0	14.8	4.4
62	Health care and social assistance	175,900	1.8	9.2	21.8	25.2	25.9	13.7	2.3
	Total (private industry, 16 years and over)	1,234,680	3.4	10.9	23.8	25.5	23.1	11.1	2.2

Source: From Bureau of Labor Statistics, Table R37, <http://www.bls.gov/iif/oshwc/osh/case/ostb1693.txt>

Notes: Dash (—) indicates data are unavailable. Because of rounding and data exclusion of nonclassifiable responses, data may not sum to the totals.

^a NAICS, U.S. Census Bureau, www.census.gov/epcd/www/naics.html

^b Excludes medical and diagnostic laboratories (NAICS 6215) where data is unavailable.

Data by Selected Occupations

This section focuses on selected health care occupational groups, those which experienced the highest number of nonfatal injuries and illnesses involving days away from work in 2005. These include nursing aides, orderlies and attendants, registered nurses, licensed practical and vocational nurses, home health aides, personal and home care aides, and child care workers.

Tables 2.15 and 2.16 display the 2005 percent distribution of nonfatal injuries and illnesses involving days away from work by the sex, race, ethnic origin, and the age group of workers in these six occupations and private industry. Women in these occupations experienced most of the injury and illness burden, representing 84%–98% of the reported cases. With exception of registered nurses, Blacks in these occupations also experienced a disproportionately higher number of cases as compared to their counterparts in private industry. Registered nurses represented the only occupational group that experienced a disproportionately higher number of cases for Asian workers, as compared to private industry. The percents for Hispanics in each of the six occupations were less than their counterparts in private industry. When compared to private industry, there was a greater proportion of injury and illness cases in the older age groups for many of these occupations, with the exception of nursing aides, orderlies and attendants, and child care workers.

Fatal Occupational Injuries

In 2005, HCSA accounted for 104 work-related fatalities.¹³ Fifty-six (56%) of these fatalities involved transportation accidents (mostly highway accidents). Assaults and violent acts accounted for 21% of the fatal occupational injuries within the HCSA sector, with about an equal number of homicides and suicides.

TABLE 2.15 Percent Distribution of Nonfatal Injuries and Illnesses Involving Days away from Work by Sex, Race, or Ethnic Origin of Worker for Occupations in HCSA Sector with Highest Number of Cases in 2005

Occupation	Lost Day Injury and Illness Cases	Percent Distribution of Nonfatal Injuries and Illnesses Involving Days away from Work			
		Women	Black or African American ^a	Hispanic or Latino ^a	Asian ^a
Nursing aides, orderlies, and attendants	52,150	89	31.6	8.6	2.1
Registered nurses	20,100	92	7.8	3.5	6.6
Licensed practical nurses and licensed vocational nurses	7,190	93	17.1	3.7	1.4
Home health aides	7,110	98	23.4	11.4	1.0
Personal and home care aides	4,420	84	33.2	10.2	—
Child care workers	2,560	86	33.9	10.2	—
Total (private industry, 16 years and older)		33.7	11.8	19.0	1.5

Source: From Bureau of Labor Statistics, Table R42, <http://www.bls.gov/iif/oshwc/osh/case/ostb1698.txt> and Table R43, <http://www.bls.gov/iif/oshwc/osh/case/ostb1699.txt>

Notes: Dash (—) indicates data are unavailable. Because of rounding and data exclusion of nonclassifiable responses, data may not sum to the totals.

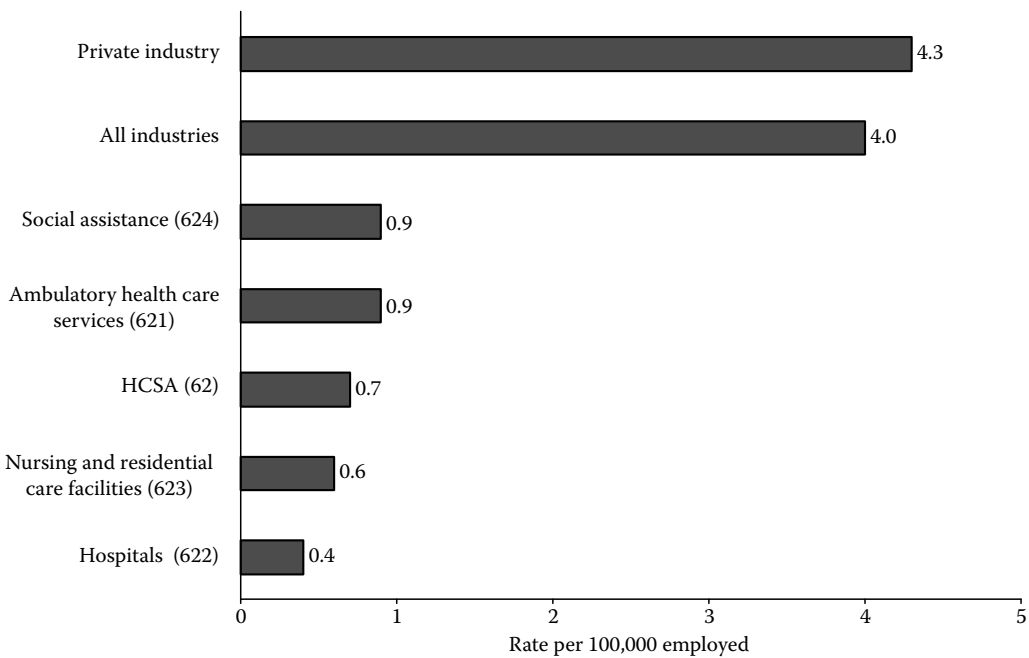
^a Includes women and men.

TABLE 2.16 Percent Distribution of Nonfatal Injuries and Illnesses Involving Days away from Work by Age for Occupations in HCSA Sector with Highest Number of Cases in 2005

Occupation	Lost Day Nonfatal Injury and Illness Cases	Percent of Nonfatal Injury and Illness Cases Involving Days away from Work by Age Group						
		16–19	20–24	25–34	35–44	45–54	55–64	65 and Over
Nursing aides, orderlies, and attendants	52,150	3.1	15.0	26.7	26.3	19.6	8.2	1.0
Registered nurses	20,100	0.6	2.2	0.7	26.6	34.8	17.2	2.6
Licensed practical nurses and licensed vocational nurses	7,190	0.3	2.8	21.3	27.9	30.5	15.8	1.1
Home health aides	7,110	0.4	8.0	18.5	20.3	30.8	19.2	2.7
Personal and home care aides	4,420	1.4	12.9	15.2	23.9	25.9	16.4	4.3
Child care workers	2,560	2.3	27.7	27.3	16.8	20.3	4.7	1.2
Total (private industry, 16 years and older)		3.4	10.9	23.8	25.5	23.1	11.1	2.2

Source: From Bureau of Labor Statistics, Table R41, <http://www.bls.gov/iif/oshwc/osh/case/ostb1697.txt>

In 2005, the incidence rate of fatal work-related injuries in the HCSA sector was 0.7 per 100,000 workers in 2005, compared to an incidence rate of 4.3 in private industry (Figure 2.22). Among the four sub-sectors, hospitals accounted for the lowest incidence rate (0.4) and ambulatory care services and social assistance represented the highest rate (0.9).



Note: NAICS codes in parentheses follow industry sector name.

FIGURE 2.22 Rate of fatal occupational injuries, HCSA sector and private industry, 2005. (From Bureau of Labor Statistics, Census of Fatal Occupational Injuries, Special tabulation—Number and rate of fatal occupational injuries by selected worker characteristics, 2003–2005, <http://www.bls.gov/iif/>)

Other Key Facts^{9,14}

- In 2005, strains and sprains were the leading nature of injury in every major industry sector. HCSA accounted for nearly one in five cases of all sprains and strains.
- In 2005, HCSA accounted for one in five cases of all falls on the same level. Two-thirds of these cases were reported by nursing and residential care facilities and hospitals.
- Nursing aides, orderlies, and attendants experienced the third highest number of days away from work in 2005 (52,150 cases) among all occupations and the highest among health care occupations, with the majority (89%) of the cases involving women. Injuries to these workers were attributable to health care patients 58% of the time and were due to overexertion for 54% of the cases. The median number of days away from work for this occupation was 5.
- Registered nurses accounted for the 11th highest number of injuries and illnesses involving days away from work in 2005 (20,100) among all occupations and the 2nd highest among health care occupations. The median number of lost workdays for this occupation was 6.
- In 2005, the combined number of injury and illness cases involving days away from work for nursing aides, orderlies, and attendants; and registered nurses (72,250 cases) accounted for over 40% of all injuries and illnesses involving days away from work in the HCSA sector.
- The HCSA sector accounted for nearly 20% ($n = 72,780$) of all work-related MSDs involving days away from work in 2005, exceeding all industry sectors. Nursing aides, orderlies, and attendants had the highest number of MSD cases among health care occupations (28,920) and the second highest among all occupations. Registered nurses had the second highest number of cases among health care occupations (9,060) and the eighth highest number among all occupations. Home health aides and licensed practical and vocational nurses had the next highest number of MSD cases among health care occupations, ranking in the top 25 of all occupations.
- In 2005, two-thirds of personal assaults and violent acts occurred in the HCSA sector.

Reported BLS Cases Underestimate Magnitude of Occupational Injuries and Illnesses

Studies have shown that the BLS SOII fails to capture a large proportion of job-related injuries and illnesses of private sector employers.¹⁵⁻¹⁷ A recent study of injury and illness reporting in Michigan found that the SOII missed more than two-thirds of job-related injuries and illnesses,¹⁵ while another study estimated that the SOII missed between 33% and 69% of all injuries and illnesses.¹⁶ Additionally, major changes in OSHA recordkeeping rules in 1995 and 2002 have been shown to correspond directly to substantial declines in the number of SOII recordable injuries and illnesses.¹⁸ For example, starting in 2002, MSDs were recorded in the "all other illnesses" illness category on OSHA Form 300 that, in effect, lumped MSDs in with all reported illnesses not categorized as skin disorders, respiratory ailments, poisonings, or hearing loss. The change has been perceived by many to obscure the magnitude of MSD cases in Health Care and other industries where MSDs represent a major problem.

Apart from regulatory changes, causes of underreporting of nonfatal injuries and illnesses are many and diverse.¹⁷ Causes for underreporting by employers include the following: neglect for or lack of knowledge of recordkeeping requirements, negative impact of injury records on management bonuses, control increase of workers' compensation/insurance rates, avoid targeted OSHA inspections, or maintain eligibility for contracts requiring a good safety record. Likewise, workers may not report safety or health problems to their employers for many reasons, such as fear of disciplinary action, not wanting supervisor to think worker was careless, injury too minor to report, unable to afford lost work time, lack of awareness that problem is work related (particularly true for diseases with long latency periods), injury is considered part of the job (particularly true of health care workers), frustration with workers' compensation procedures, or negative impact on company goal of a perfect safety record (especially when reinforced by incentive programs that inadvertently result in peer pressure and are perceived to offer large rewards for hiding injuries). Despite these limitations,

the data from the SOII represent the only source of national data on the numbers and rates of occupational injuries and illnesses.

Infectious Disease Data

Sharps Injuries

Two surveillance systems have been developed to measure SIs among health care workers: the Exposure Prevention Information Network (EPINet) at the University of Virginia (http://www.healthsystem.virginia.edu/internet/epinet/about_epinet.cfm) and the CDC's National Surveillance System for Hospital Health Care Workers (NaSH) (<http://www.cdc.gov/ncidod/dhqp/nash.html>). Characteristics of these two systems and data derived from them are shown in Table 2.17. Data from EPINet and NASH, adjusted for underreporting, have been used to estimate that 384,325 percutaneous injuries are sustained annually by hospital-based health care personnel.¹⁹ Since almost half of U.S. health care workers work outside of hospitals, as many as 600,000–800,000 SIs (Table 2.18) may occur annually among all health

TABLE 2.17 SI Surveillance Data from Four Sources

Characteristic	EPINet	NaSH	Massachusetts	California
Number of sites	48 hospitals	26 hospitals	99 hospitals	316 (of >3000 licensed acute care hospitals, home health care agencies, and skilled nursing facilities)
Most recent published data	2003	Summary report June 1995 to July 1999	2004	1998–1999
Number of SIs per year reported	1728	1380 (average)	3279	976 (average)
Rate of SIs in most recent year available	23.87 SIs per 100 occupied beds		18.3 per 100 licensed hospital beds	
Occupations associated with injuries	37.9% nurses	44% nurses	39% nurses	49% nurses
	22.1% physicians	30% physicians	33% physicians	9% physicians
	9.0% surgery attendants	13% technicians	20% technicians (includes surgical, phlebotomists, and clinical laboratories)	10% technologists
	5.4% phlebotomist/venipuncture/IV team			9% aides, orderlies, and nursing assistants
	2.4% clinical laboratory workers			8% phlebotomists
Devices associated with injuries	32% disposable syringes	34% syringes	31% hypodermic needles	32% disposable
	21% suture needles	16% suture needles	22% suture needles (56% hollow bore needle: hypodermic, butterfly, vacuum tube, and others)	
		13% butterfly needles		
Injuries with safety devices	32%	4.3 (195/4569)	33%	

Sources: From Perry, J., Parker, G., and Jagger, J., *Adv. Expo. Prev.*, 7, 42, 2005; National Surveillance System for Hospital Health Care Workers Summary Report for data collected from June 1995 through July 1999; Sharps Injuries among Hospital Workers in Massachusetts, 2004: Findings from the Massachusetts Sharps Injury Surveillance System, published April 2007; Cone, J., *Calif. Morbidity*, September 2000.

TABLE 2.18 Frequency Estimates for the United States, 1998

Health Outcome	Estimated Number
SIs	600,000–800,000
Occupationally acquired hepatitis B infection	461
Occupationally acquired acute hepatitis B	132
Occupationally acquired acute hepatitis C	70
Occupationally acquired HIV	1

Sources: From CDC, *NIOSH Alert: Preventing Needlestick Injuries in Health Care Settings*, Department of Health and Human Services, CDC, Cincinnati, OH, DHHS (NIOSH) Publication No. 2000-108, 1999; Personal communication with Ian Williams, Division of Viral Hepatitis (DVH), CDC, February 1, 2002 and Annemarie Wasley, DVH, CDC, April 20, 2007; Do, A.N., Ciesielski, C.A., Metler, R.P., Hammett, T.A., Li, J., and Fleming, P.L., *Infect. Control Hosp. Epidemiol.*, 24, 86, 2003.

care workers, but little data are available about the occurrence of SIs in outpatient settings.²⁰ A few states, including Massachusetts and California, have also developed their own SI surveillance systems. Based on data from these surveillance systems, it is known that most reported SIs are associated with hypodermic syringes or other hollow-bore needles and most reported SIs occur in nursing, medical, or laboratory staff, but housekeepers and other health care workers are also at risk (Table 2.17).^{21–24}

Although reported SIs among health care workers are a common occurrence, fortunately, they rarely lead to infection with bloodborne pathogens (Table 2.18).^{20,25,26} Using mathematical modeling, the World Health Organization estimated the incidence of infections attributable to percutaneous injuries and concluded that 39% of HCV, 37% of HBV, and 4.4% of HIV infections acquired among health care workers worldwide in 2000 were attributable to occupational exposure via SIs. The occupational attributable fractions for the United States were estimated to be substantially lower: 8%, 1%, and 0.5% for HCV, HBV, and HIV, respectively. The probability of acquiring an infection depends on the prevalence of infection among the patient population, the probability of health care worker exposure, the probability of infection occurring after exposure, and the proportion of health care workers that are susceptible to infection.²⁷ Sepkowitz and Eisenberg estimated annual death rates for U.S. health care workers from occupational events to be 17–57 per 1 million workers. They attributed more than half of these deaths (between 80 and 260 total deaths in 2002) to infection; 75–250 deaths from HBV, and 5–10 deaths from HIV, HCV, and tuberculosis (TB) combined. Their estimates were based on reported rates of needlestick injuries, infection prevalence among patients, reported infections among health care workers, and the risk of dying from infections once acquired.²⁸

HIV

The average risk of HIV transmission after a percutaneous exposure from a known positive source is estimated to be 0.3%. Risk factors for transmission include exposure to a large quantity of blood from the source person (e.g., device visibly contaminated with patient’s blood, procedure involving a needle being placed directly into a vein or artery, or deep injury), exposure to blood from a source person with terminal illness, hollow-bore needles, and, possibly, immunologic factors in the exposed worker.²⁹

Data on HIV infection and AIDS among health care workers have been collected by the CDC through the HIV/AIDS Reporting System and the National Surveillance for Occupationally Acquired HIV Infection System.³⁰ Health care personnel with HIV/AIDS who are reported without any known risk for HIV infection are investigated by state and local health departments using the following case definitions. Documented cases of occupationally acquired HIV/AIDS are those in which HIV seroconversion is temporally related to an exposure to an HIV-positive source and in which the exposed worker has no nonoccupational risk factors for acquisition of HIV (e.g., male homosexual-bisexual contact or IV drug use). Possible cases of occupationally acquired HIV/AIDS are those in which a

TABLE 2.19 Occupations of Health Care Workers with Documented and Possible Occupationally Acquired HIV Infection, 1981–2006

Occupation	Documented	Possible
Nurse	24	35
Laboratory technician (clinical)	16	17
Physician (nonsurgical)	6	12
Laboratory technician (nonclinical)	3	—
Housekeeper/maintenance workers	2	13
Technician (surgical)	2	2
Embalmer/morgue technician	1	2
Health aide/attendant	1	15
Respiratory therapist	1	2
Technician (dialysis)	1	3
Dental worker (including dentist)	—	6
Emergency medical technician (paramedic)	—	12
Physician (surgical)	—	6
Other technician/therapist	—	9
Other health care occupation	—	6
Total	57	140

Source: From Do, A.N., Ciesielski, C.A., Metler, R.P., Hammett, T.A., Li, J., and Fleming, P.L., *Infect. Control Hosp. Epidemiol.*, 24, 86, 2003.

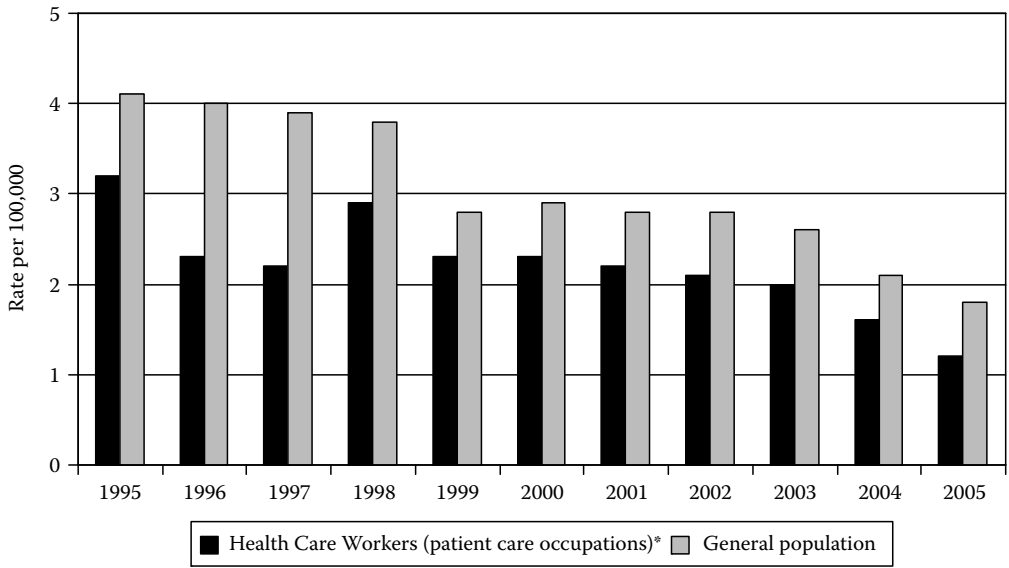
Note: Dash (—) indicates no reported cases.

worker is found to be HIV positive, has no nonoccupational risk factors for HIV/AIDS, and has opportunities for occupational exposure to blood, body fluids, or HIV-positive laboratory material. More than 90% of health care personnel infected with HIV have reported nonoccupational risk factors for acquiring their infection.

Between 1981 and 2006, the CDC received reports of 57 documented cases and 140 possible cases of occupationally acquired HIV in U.S. health care workers (Table 2.19). Thirty-one (54%) of the implicated exposures occurred prior to 1991. Eight of the documented HIV cases occurred despite antiviral postexposure prophylaxis. No documented occupationally acquired cases of HIV infection have been reported since 1999, and the most recent possible case of occupationally acquired HIV was reported in 2000.

HBV

CDC estimated an incidence of 17,000 HBV infections per year among health care workers in 1983, which declined to approximately 400 in 1995, after widespread immunization of health care workers, implementation of universal precautions, and adoption of the OSHA bloodborne pathogens standard. In 1983, the estimated incidence of HBV infections among health care workers was threefold higher than the incidence in the general U.S. population (386 per 100,000 vs. 122 per 100,000). By 1995, however, the estimated incidence of HBV infections among health care workers was more than fivefold lower than the incidence in the general U.S. population (9.1 per 100,000 vs. 50 per 100,000).³¹ The CDC's Division of Viral Hepatitis estimates that 139 cases of acute HBV were occupationally acquired in 1995 (3.2 per 100,000 health care workers in patient care occupations), which declined to 87 in 2004 (1.6 per 100,000 workers) (Figure 2.23).^{25,32}



* Patient care occupations include physicians, dentists, nurses, physicians' assistants, and health technologists and technicians.

FIGURE 2.23 Incidence of acute hepatitis B among health care workers. (From personal communication with Ian Williams, Division of Viral Hepatitis (DVH), CDC, February 1, 2002 and Annemarie Wasley, DVH, CDC, April 20, 2007; CDC, *Morbidity Mortality Wkly Rep*, 56, 2007; Household Data Annual Averages, Current Population Survey, Bureau of Labor Statistics, U.S. Department of Labor, 1995–2005.)

HCV

From 1999 through 2004, the percentage of patients with acute hepatitis C case who reported being health care workers averaged about 2% (range: 1%–4%). This increased to 7.2% in 2005. It is unknown what proportion of these cases was occupationally acquired.³³ It has been estimated that percutaneous exposure leads to 50–150 transmissions of HCV among health care workers annually, assuming that hospitalized patients have the same HCV seroprevalence as the rest of the U.S. population.²⁸ Seroprevalence studies of HCV in health care workers suggest minimally increased risk compared with the general population.³⁴

Tuberculosis

The TB incidence in health care workers declined from 4.9 per 100,000 workers in the health care industry in 1994 to 3.0 in 2005 (Figure 2.24).^{32,35,36} In 2005, 3.1% (420) of nationally reported TB cases for whom occupational information was available occurred among health care workers.³⁶

The prevalence of TB among health care workers in 2006 (3.2 per 100,000 population) was higher than the prevalence of TB among health care workers in 2005 (3.1 per 100,000 population), and the prevalence has been slightly increasing since 2001. The risk of occupational acquisition of TB among health care personnel has increased due to the emergence of multidrug-resistant and extensively drug-resistant TB and the need to hospitalize patients not responding to traditional outpatient antibiotic regimens. Even though the incidence of TB is decreasing in the U.S. population, health care personnel remain at risk without careful adherence to engineering and administrative controls.^{37,38}

Other

A recent review found published case reports of occupationally acquired bloodborne infections for a total of 60 pathogens or species: 26 viruses, 18 bacteria/rickettsia, 13 parasites, and 3 yeasts.³⁹

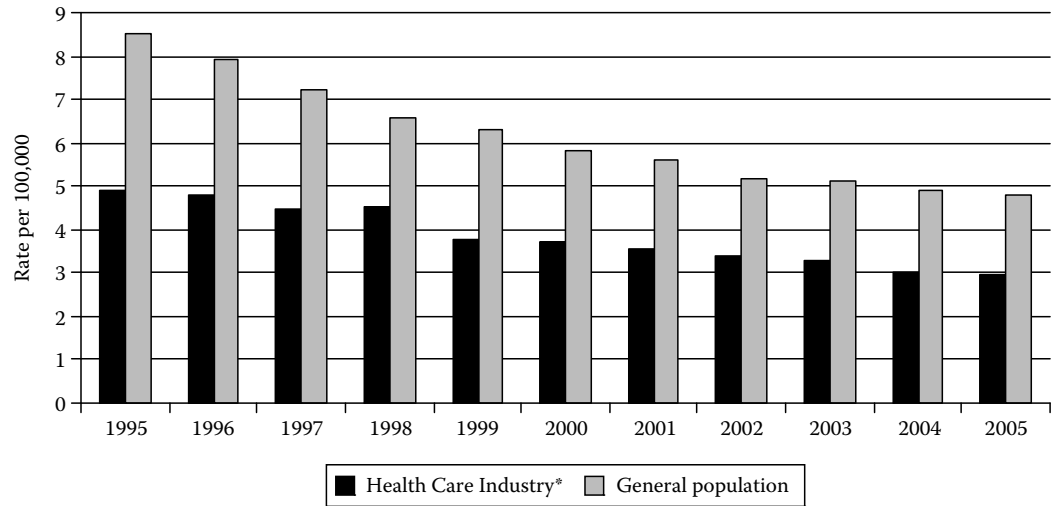


FIGURE 2.24 Incidence of TB among health care workers. (From Online Tuberculosis Information System (OTIS), National Tuberculosis Surveillance System, United States, 1993–2004, U.S. Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), Division of TB Elimination, CDC WONDER Online Database, March 2006; CDC, Reported Tuberculosis in the United States, 2005, U.S. Department of Health and Human Services, CDC, Atlanta, GA, September 2006; Household Data Annual Averages, Current Population Survey, Bureau of Labor Statistics, U.S. Department of Labor, 1995–2005.)

Disease and Cause-Specific Mortality Data

Death certificate data information from the NOMS (National Occupational Mortality Surveillance) system, with multiple cause of death, coded usual or lifetime occupation, and industry information, were used to assess whether any associations exist between cause-specific mortality and occupation and industry. For this surveillance system, 28 states have provided coded data for this surveillance system for the years 1984–1998 and multiple cause analysis was conducted. The measure of association used most often was the proportionate mortality ratio (PMR), defined as the ratio of the proportion of deaths due to a specific cause for a specified occupation or industry during a specified time period divided by the proportion of deaths due to that cause for all occupations or industries during the same period, multiplied by 100. A PMR is considered to be significantly elevated when its value is greater than 100 and the lower 95% confidence interval (CI) exceeds 100. A significantly elevated PMR suggests that more deaths than expected are associated with a given cause of death in a specified occupation or industry. PMRs should be interpreted as flags or indicators that describe gaps, trends, and elevated risks for serious, acute and chronic disease, and fatal injuries. The NOMS system is available on the Web as an interactive query system for access to precalculated PMRs by occupation or industry.⁴⁰

NOMS data were analyzed to produce mortality estimates for each of the four HCSA industry subsectors and for 18 major health care occupations (Tables 2.20 and 2.21, respectively). PMRs for the top 10 causes of death (i.e., most highly and significantly elevated causes of death), excluding those associated with small numbers of deaths, are reported in Table 2.20. Three causes of death (AIDS, non-A and non-B viral hepatitis, and various cancers) were observed in all four subsectors. Drug-related deaths were observed in all three health care subsectors. The following causes of death were observed in two of the subsectors: viral hepatitis B (ambulatory health care services and hospitals), sarcoidosis (hospitals and social assistance), and malignant melanoma of the skin and polyarteritis nodosa and allied conditions (ambulatory health care services and social assistance). Of the top 10 causes of death in

TABLE 2.20 Top 10 Significantly Elevated PMRs by HCSA Industry Subsector, 1984–1998

2002 NAICS Code ^a	CIC ^b	Industry	Cause of Death (ICD-9 Codes) ^c	PMR ^d	Number of Deaths	95% CI LCL, UCL
621	812, 820–822, 830, and 840	Ambulatory health care services	Air and space transport accidents (840–845)	380**	97	308, 464
			Other lung diseases due to external agents, excluding inhalation (506 and 5071–508)	219**	37	154, 302
			Viral hepatitis B (0701 and 0703)	186**	69	144, 235
			(AIDS) HIV infection (042–044)	176**	940	165, 187
			Non-A and non-B viral hepatitis (0704–0709)	159**	103	130, 193
			Myoneural disorders (358)	155**	53	116, 203
			Polyarteritis nodosa and allied conditions (446)	147**	97	120, 180
			Hodgkin's disease (201)	145**	127	121, 172
			Drug-related deaths (292, 304, 3052–3059, 850–858, 9500–9505, 9620, and 9800–9805)	143**	760	134, 154
			Malignant melanoma of skin (172)	142**	418	129, 156
622	831	Hospitals	(AIDS) HIV infection (042–044)	163**	2875	158, 167
			Sarcoidosis (135)	149**	269	132, 169
			Viral hepatitis B (0701, 0703)	145**	155	123, 169
			Non-A and non-B viral hepatitis (0704–0709)	121**	231	106, 137
			Drug-related deaths (292, 304, 3052–3059, 850–858, 9500–9505, 9620, and 9800–9805)	119**	1760	114, 124
			Cancer of small intestine, including duodenum (152)	119**	147	101, 140
			Asthma (493)	118**	1575	113, 123
			Disorders of the peripheral nervous system (350–357)	118*	249	104, 134
			Diffuse diseases of connective tissue (710)	115*	927	108, 123
			Acute myeloid leukemia	114**	681	105, 123
623	832 and 870	Nursing and residential care facilities	Accidents caused by storms, floods, and earth eruption (908–909)	209*	10	100, 384
			(AIDS) HIV infection (042–044)	148**	945	139, 158
			Cancer of unspecified female genital organs (184)	141**	83	112, 175
			Non-A and non-B viral hepatitis (0704–0709)	135*	74	106, 170

(continued)

TABLE 2.20 (continued) Top 10 Significantly Elevated PMRs by HCSA Industry Subsector, 1984–1998

2002 NAICS Code ^a	CIC ^b	Industry	Cause of Death (ICD-9 Codes) ^c	PMR ^d	Number of Deaths	95% CI LCL, UCL
			Cancer of cervix uteri (180)	123**	440	111, 135
			Diabetes mellitus (250)	118**	5700	115, 120
			Drug-related deaths (292, 304, 3052–3059, 850–858, 9500–9505, 9620, and 9800–9805)	113**	550	103, 122
			Endocrine, nutritional, metabolic, and immunity disorders (240–279)	111**	8080	109, 114
			Motor vehicle traffic accidents (810–819)	110**	1352	105, 115
			Cancer of pancreas (157)	109*	790	102, 117
624	871	Social assistance	Non-A and non-B viral hepatitis (0704–0709)	190**	42	137, 257
			(AIDS) HIV infection (042–044)	186**	514	170, 202
			Neurotic and personality disorders (300–301)	171*	27	113, 249
			Sarcoidosis (135)	163**	35	114, 227
			Polyarteritis nodosa and allied conditions (446)	153*	30	103, 219
			Malignant melanoma of skin (172)	143**	108	117, 172
			Mental disorders associated with solvent exposures (296–297, 300–301, and 3483)	136**	85	109, 169
			Lymphoid leukemia (204)	127*	78	100, 159
			Cancer of bone, connective tissue, skin, and breast (170–175)	122**	1263	117, 172
			Infectious and parasitic diseases (001–139)	120**	1716	115, 125

* = $p < 0.05$; ** = $p < 0.01$.

^a NAICS, U.S. Census Bureau, www.census.gov/epcd/www/naics.html

^b Census Industry Code, U.S. Census Bureau, http://www.census.gov/apsd/techdoc/cps/mar96/append_a.html

^c Multiple cause PMR analysis was conducted using the ninth revision of the International Classification of Diseases (ICD-9) to code cause of death.

^d PMR is defined as the ratio of the age-adjusted proportion of deaths from a specific cause of death for a particular occupation or industry during a specified time period compared to the proportion of that cause among all industries or occupations during the same period, multiplied by 100. To test for statistical significance, two-sided 95% CIs are calculated, based on the Poisson distribution for observed deaths, and using the normal approximation to the Poisson for large numbers. A statistically significantly elevated PMR must be interpreted as a flag that suggests elevated risk that should be further evaluated for confounding factors.

TABLE 2.21 Top Three Significantly Elevated PMRs for Largest Occupations in HCSA Sector, 1984–1998

Occupation	COC ^a	Total Employed (in Thousands)	Cause of Death (ICD-9 Codes) ^b	PMR ^c	Number of Deaths	95% CI LCL, UCL
Registered nurses	095	2,529	Air and space transport accidents (840–845)	211**	28	140, 305
			Viral hepatitis B (0701 and 0703)	192**	58	146, 248
			(AIDS) HIV infection (042–044)	180**	587	166, 195
Health aides (except nursing)	447	1,906 ^d	Myoneural disorders (358)	245**	8	106, 483
			Hodgkin’s disease (201)	216**	21	134, 330
			(AIDS) HIV infection (042–044)	154**	139	130, 182
Nursing aides, orderlies, and attendants	446		(AIDS) HIV infection (042–044)	172**	1416	166, 178
			Non-A and non-B viral hepatitis (0704–0709)	171**	120	142, 205
			Viral hepatitis B (0701 and 0703)	152**	60	116, 196
Child care workers	406 and 468	1,401	Systemic sclerosis (7101)	154*	27	102, 224
			Lymphatic cancer and multiple myeloma (202–203)	123**	223	108, 140
			Cancer of ovary and other uterine adnexa (183)	120*	207	104, 138
Physicians	084	863	Air and space transport accidents (840–845)	942**	65	727, 1201
			Viral hepatitis B (0701 and 0703)	304**	28	202, 439
			Drug-related deaths (292, 304, 3052–3059, 850–858, 9500–9505, 9620, and 9800–9805)	300**	241	263, 340
Personal service occupations, nec (includes personal and home care aides)	469	703	(AIDS) HIV infection (042–044)	199**	129	166, 236
			Chronic myeloid leukemia (2051)	171*	20	105, 264
			Cancer of urinary organs (188 and 1893–1899)	144**	73	113, 181
Licensed practical nurses	207	556 (includes licensed vocational nurses)	Sarcoidosis (135)	161*	34	112, 226
			Drug-related deaths (292, 304, 3052–3059, 850–858, 9500–9505, 9620, and 9800–9805)	146**	226	127, 166
			(AIDS) HIV infection (042–044)	146**	174	126, 170

(continued)

TABLE 2.21 (continued) Top Three Significantly Elevated PMRs for Largest Occupations in HCSA Sector, 1984–1998

Occupation	COC ^a	Total Employed (in Thousands)	Cause of Death (ICD-9 Codes) ^b	PMR ^c	Number of Deaths	95% CI LCL, UCL
Health diagnosing practitioners	089	425	Anterior horn cell disease including motor neurone disease (335)	333**	13	177, 569
			Asthma (493)	218*	13	116, 373
			Cancer of brain and nervous system (191–192)	201**	22	126, 305
Clinical laboratory technologists and technicians	203	321	Viral hepatitis B (0701 and 0703)	348**	18	206, 550
			Toxic encephalopathy (3483)	192**	24	123, 285
			Sarcoidosis (135)	191*	15	107, 315
Dental assistants	445	274	Hodgkin's disease (201)	264**	11	132, 472
			(AIDS) HIV infection (042–044)	163*	28	109, 236
			Alzheimer's disease (290, 3310, and 3311)	155**	125	129, 184
Pharmacists	096	245	Drug-related deaths (292, 304, 3052–3059, 850–858, 9500–9505, 9620, and 9800–9805)	242**	90	194, 297
			Cancer of ovary and other uterine adnexa (183)	179**	30	121, 255
			Cancer of brain and nervous system (191–192)	165**	79	130, 205
Physical therapists	103	198	(AIDS) HIV infection (042–044)	200**	35	140, 279
			Cancer of bone, connective tissue, skin, and breast (170–175)	179**	26	117, 262
			Non-Hodgkin's lymphomas (200, 2020–2022, 2028, and 2029)	151**	100	123, 184
Dentists	085	196	Air and space transport accidents (840–845)	643**	15	360, 1060
			Disorders of the peripheral nervous system (350–357)	218**	15	122, 359
			Chronic myeloid leukemia (2051)	213**	17	124, 342
Radiologic technicians	206	182	TB (010–018 and 137)	307*	12	159, 537
			(AIDS) HIV infection (042–044)	216**	73	170, 272
			Accidental poisonings (850–869 and 9292)	168*	25	109, 248

Emergency medical technicians (EMTs), paramedics, and other technologists	208	156 (EMTs alone)	(AIDS) HIV infection (042–044)	168**	199	146, 194
			Infectious and parasitic diseases (001–139)	124**	514	113, 136
			Alzheimer's disease (290, 3310, and 3311)	124*	99	101, 151
Dental hygienists	204	144	Accidental falls (880–888 and 9293)	174*	19	105, 272
			Cancer of ovary and other uterine adnexa (183)	167*	26	109, 244
			Cancer neoplasm of breast (174 and 175)	156**	92	126, 191
Speech therapists (speech language pathologists)	104	114	Mental disorders associated with solvent exposures (296–297, 300–301, and 3483)	360*	6	132, 783
				279*	6	102, 607
			Multiple sclerosis and other demyelinating diseases of central nervous system (340–341)			
Health record technicians	205	98	Cancer of brain and nervous system (191–192)	209*	11	104, 373
			(AIDS) HIV infection (042–044)	213**	27	140, 310
			Lymphatic cancer and multiple myeloma (202–203)	164*	31	112, 233
			Mental disorders related to substance abuse (291–292 and 303–305)	148*	33	102, 208

^a Census Occupation Code (COC), U.S. Census Bureau, <http://www.census.gov/hhes/www/ioindex/view.html>

^b Multiple cause PMR analysis was conducted using the ninth revision of the International Classification of Diseases (ICD-9) to code cause of death

^c PMR is defined as the ratio of the age-adjusted proportion of deaths from a specific cause of death for a particular occupation or industry during a specified time period compared to the proportion of that cause among all industries or occupations during the same period, multiplied by 100. To test for statistical significance, two-sided 95% CIs are calculated, based on the Poisson distribution for observed deaths, and using the normal approximation to the Poisson for large numbers. A statistically significantly elevated PMR must be interpreted as a flag that suggests elevated risk that should be further evaluated for confounding factors.

^d Separate employment figures for health aides (except nursing) and nursing aides, orderlies, and attendants are unavailable.

* $p < 0.05$; ** $p < 0.01$.

ambulatory health care services, those unique to this subsector included air and space transport accidents, other lung diseases due to external agents, and myoneural disorders. Of the top 10 causes of death in hospitals, those unique to this subsector included asthma, disorders of the peripheral nervous system, and diffuse diseases of connective tissue and acute myeloid leukemia. Of the top 10 causes of death in nursing and residential care facilities, those unique to this subsector included accidents caused by nature; diabetes mellitus; endocrine, nutritional, metabolic, and immunity disorders; and motor vehicle traffic accidents. Of the top 10 causes of death in social assistance, those unique to this subsector included neurotic and personality disorders, mental disorders associated with solvent exposure, and infectious and parasitic diseases.

Table 2.21 presents the top 3 significantly elevated PMRs for each of the 18 largest HCSA occupations. Infectious diseases (AIDS, hepatitis, etc.) were among the top 3 significantly elevated PMRs for 11 of the 18 occupations, with AIDS being the most prevalent, accounting for thousands of deaths. Several cancers (small intestine, female genital organs, pancreas, bone, and Hodgkin's disease) were also among the top 3 significantly elevated PMRs for 11 of the 18 occupations. Other causes that were observed in more than one occupation included lymphatic cancer and multiple myeloma, drug-related deaths, air and space transport accidents, sarcoidosis, and mental disorders.

Data Source Limitations

The ability to describe the distribution and determinants of occupational injury, disease, and mortality has improved since the passage of the Occupational Safety and Health Act. However, occupational safety and health surveillance data remain fragmented and have substantial gaps. This section is illustrative of the fragmented nature of occupational health statistics, though providing the reader with information representative of the current statistical and surveillance data sources. As noted recently by Rosenman and colleagues, no comprehensive occupational injury and illness (acute and chronic) surveillance system exists in the United States, either at the national or state levels.¹⁵

Each of the data sources used herein has limitations, particularly those that attempt to quantify reports of occupational injury and illness (i.e., disease caused by exposures at work). For example, the design of SOII, conducted annually by the U.S. BLS, excludes ~22% of the labor force (self-employed workers, public sector workers, and individuals employed on farms employing 10 or fewer workers). In 1987, the National Academy of Sciences reported on deficiencies in the BLS's occupational health and safety statistical programs.⁴¹ Despite improvements to the SOII, recent studies have reported that the SOII substantially undercounts acute nonfatal injuries, and is generally believed to undercount both acute and chronic illnesses from chronic chemical and other exposures. Recordkeeping and regulatory changes have been suggested as explaining recent declines in the magnitude of occupational injuries and illnesses.¹⁸

Selected data on occupational mortality are presented in this section. The strengths and limitations of death certificate data have been discussed at length.^{42,43} The fact that many individuals do not die as a direct result of their work-related disease prompts NIOSH to maintain surveillance for all causes of death, underlying and contributing. Certifying physicians typically do not list all of a decedent's diseases on the death certificate. As with any analysis based on death certificate data, there is undoubtedly some misclassification of cause of death, and death certificates rely on usual industry and occupation, which may not reflect lifetime exposure histories.

Data that depend, either directly or indirectly, on physician reporting or recording of occupational or work-relatedness 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 Occupational Safety and Health Act of 1970), 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).

Summary

The surveillance data described in this section provide information on the health status of workers in the HCSA sector. National surveillance systems show that this sector is particularly hazardous to workers in terms of nonfatal injuries and illnesses; the HCSA sector has the second largest share of all nonfatal injury and illness cases, as well as cases involving days away from work. Incidence rates for nonfatal injuries and illnesses in this sector are driven by nursing and residential care facilities and hospitals, with rates nearly double of those in all private industry. Predominant injuries and illnesses among health care workers include sprains and strains; injuries associated with slips, trips, and falls; overexertion/repetitive trauma injuries associated with patient lifting and assaults from patients; and SIs. Disease and cause-specific mortality data show significantly elevated causes of death in the sector for infectious disease, various cancers, and drugs. Limitations associated with the various reported data are also provided and underscore the importance of improved surveillance of acute and chronic illnesses and acute nonfatal injuries in this sector.

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S e c o n d E d i t i o n

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