

Data on total job openings in Tables 2 and 6 revised May 2000.

### Employment outlook: 1998–2008

# Occupational employment projections to 2008

*Occupations requiring an associate degree or more education, which accounted for one-fourth of all jobs in 1998, will account for 40 percent of total job growth from 1998 to 2008*

Douglas  
Braddock

Total employment is projected to increase by 20.3 million jobs over the 1998–2008 period, rising from 140.5 million to 160.8 million, according to the latest projections of the Bureau of Labor Statistics. (See box on page 4 in the article by Charles Bowman.) The projected 14.4-percent change in employment is less than the 17.1-percent increase attained during the previous 10-year period, 1988–98, when the economy added 20.5 million jobs.<sup>1</sup>

The economy will continue generating jobs for workers at all levels of education and training, although growth rates are projected to be faster, on average, for occupations requiring at least an associate degree than for occupations requiring less training. However, most job growth will be in occupations requiring less formal education or training, even though many of these occupations are projected to have below-average growth rates. There also will be numerous job openings resulting from the need to replace workers who leave the labor force or move to other occupations.

This article discusses the projected changes in the structure of employment at the major occupational group level for the 1998–2008 period, along with the changes that occurred in the previous 10-year period, 1988–98. It also identifies the detailed occupations that are projected to grow at the fastest *rate*, as well as those with the largest *numerical* increases and decreases, along with their current educational and training requirements and earnings. Also discussed is the total number of job openings projected to occur due to growth in the economy

and the net replacement needs resulting from workers who leave the labor force or transfer to other occupations. The article concludes with a discussion of the distribution of employment in 1998 and projected 1998–2008 job openings by levels of education and training.

### Major groups

Among the major occupational groups, employment in professional specialty occupations will increase the fastest and add the most jobs from 1998 to 2008. (See table 1.) The group with the second fastest growth rate is technicians and related support occupations. This is a small group, however, and is expected to account for the second smallest numerical increase in jobs over the period. The next fastest growing group is service occupations and the fourth-fastest growing group is executive, administrative, and managerial occupations. Professional specialty occupations and service occupations, combined—occupational groups on opposite ends of the educational spectrum—are expected to provide 44 percent of the total job growth from 1998 to 2008. Marketing and sales occupations also are expected to have faster than average employment growth. Employment is expected to increase in precision production, craft, and repair occupations; operators, fabricators, and laborers; and administrative support occupations, including clerical, but at a slower rate than overall employment. Finally, employment in agriculture, forestry,

Douglas Braddock is an economist in the Office of Employment Projections, Bureau of Labor Statistics.

**Table 1.** Employment by major occupational group, 1988, 1998, and projected 2008

[Numbers in thousands of jobs]

Occupational group	Employment						Change			
	Number			Percent distribution			Number		Percent	
	1988	1998	2008	1988	1998	2008	1988-98	1998-2008	1988-98	1998-2008
Total, all occupations .....	120,010	140,514	160,795	100.0	100.0	100.0	20,504	20,281	17.1	14.4
Executive, administrative, and managerial .....	12,330	14,770	17,196	10.3	10.5	10.7	2,440	2,426	19.8	16.4
Professional specialty .....	15,035	19,802	25,145	12.5	14.1	15.6	4,767	5,343	31.7	27.0
Technicians and related support .....	3,880	4,949	6,048	3.2	3.5	3.8	1,069	1,098	27.6	22.2
Marketing and sales .....	12,390	15,341	17,627	10.3	10.9	11.0	2,950	2,287	23.8	14.9
Administrative support, including clerical .....	22,251	24,461	26,659	18.5	17.4	16.6	2,210	2,198	9.9	9.0
Service .....	18,554	22,548	26,401	15.5	16.0	16.4	3,993	3,853	21.5	17.1
Agriculture, forestry, fishing, and related .....	4,224	4,435	4,506	3.5	3.2	2.8	212	71	5.0	1.6
Precision production, craft, and repair .....	14,333	15,619	16,871	11.9	11.1	10.5	1,286	1,252	9.0	8.0
Operators, fabricators, and laborers .....	17,012	18,588	20,341	14.2	13.2	12.7	1,576	1,753	9.3	9.4

NOTE: Detail may not equal total or 100 percent due to rounding.

fishing, and related occupations is projected to remain virtually unchanged over the projected period.

As a result of the different growth rates among the major occupational groups, the structure of total employment will change by the year 2008. Executive, administrative, and managerial occupations; professional specialty occupations; technicians and related support occupations; and service occupations each will increase their share of total employment, as they did in the previous 10-year period, 1988-98. The group with the largest increase in employment share in the former period, professional specialty occupations, is expected to again have the largest share increase over the coming period. Marketing and sales occupations will increase their share of total employment by a small amount. Administrative support occupations, including clerical; agriculture, forestry, fishing and related occupations; precision production, craft, and repair occupations; and operators, fabricators, and laborers all are expected to decline as a proportion of total employment, as they did in the 1988-98 period.

While administrative support occupations, including clerical; precision production, craft, and repair occupations; and operators, fabricators, and laborers are expected to decrease in employment share from 1998 to 2008, all registered larger declines in the previous 10-year period. The ranking of the major occupational groups by employment size is expected to be virtually the same in 2008 as it was in 1998, with administrative support occupations including clerical ranked first, and agriculture, forestry, fishing, and related occupations ranked last.

The number of *executive, administrative, and managerial workers* is projected to increase by 16.4 percent, or 2.4 million

from 1998 to 2008, a slower growth rate than in the previous period (19.8 percent). The share of total employment represented by these workers will increase very little from 1998 to 2008. Much of the reason for the expected slowdown in job growth among executive, administrative, and managerial workers is that many industries with large concentrations of these workers are not expected to grow as rapidly as in the past.

In some major industry sectors, however, the number of executive, administrative, and managerial workers is expected to grow substantially. The services industry, including public education and State and local government hospitals,<sup>2</sup> is expected to account for the largest job growth (1.2 million) followed by finance, insurance, and real estate (363,000 jobs), wholesale and retail trade (244,000 jobs), and transportation and public utilities (108,000 jobs). The number of self-employed executive, administrative, and managerial workers is expected to increase by 361,000—more than any other major occupational group—to nearly 2.5 million by 2008 and account for 15 percent of the growth of this group. Many of these workers run their own businesses or are self-employed consultants.

Employment in *professional specialty occupations* is projected to grow the fastest and increase more—by 5.3 million workers—than any other major group over the 1998-2008 period. This group also had the fastest rate of increase and the largest job growth during the previous 10-year period. In terms of employment share, professional specialty occupations are expected to experience the largest increase, rising from 14.1 percent of total employment in 1998 to 15.6 percent in 2008. Two-thirds of the job growth is expected among teachers, librarians, and counselors; computer, mathematical and opera-

tions research occupations; and health assessment and treating occupations. These subgroups also registered the largest job gains among the professional specialties during the previous period. Employment in the engineering subgroup is expected to add 290,000 jobs by 2008, much more than the 33,000 added since 1988. This turnaround occurs mostly because defense expenditures are expected to increase slightly in the projected period rather than decreasing as they did from 1988 to 1998.

Professional specialty occupations are projected to increase in all major industrial sectors of the economy except mining, in which employment among professionals is expected to continue its long-term decline. Eighty-six percent of the employment increase for these workers is expected to occur in the services industry, including public education and State and local government hospitals, with business services, public and private education, and health services leading the way, as in the previous period. Even in manufacturing, in which overall employment is projected to decline slightly through 2008, employment of professional workers is expected to increase by 154,000 jobs (more than two-fifths are computer systems analysts, engineers, and scientists).

Other service industries expected to contribute significantly to the growth of professional workers include social services and engineering and management services. Employment of professionals in government, except State and local education and hospitals, is projected to grow by 211,000, compared with a 274,000 increase during the 1988–98 period. The number of self-employed professional specialty workers is expected to total more than 2.2 million by 2008, an increase of nearly 290,000 jobs. Opportunities for people who want to start their own businesses will be especially abundant among computer occupations and writers, artists, and entertainers. In contrast, the number of self-employed workers in health diagnosing occupations, such as physicians, is expected to decline by 32,000, continuing the trend of the past 10 years. This decline is mainly due to the shift of employment into incorporated group practice arrangements in response to managed care cost pressures.

Employment of *technicians and related support occupations* is projected to grow by 1.1 million jobs by 2008. The 22.2-percent change in employment is less than the 27.6-percent increase attained in the previous period, 1988–98. More than half of the projected employment growth among technicians—616,000 jobs—is expected within the health technicians and technologists subgroup. Considerable growth also is expected among computer programmers and paralegals and legal assistants.

Most of the projected job growth for technicians and related support occupations is expected in the services industry, including public education and State and local government hospitals. Within services, nearly half of the increase in jobs for technicians is expected in the large and rapidly grow-

ing health services industry. Engineering and management services and business services also are expected to show large employment increases for this occupational group. As in the earlier period, employment of technicians in mining and manufacturing is expected to continue its downward trend through 2008, but the projected decline in manufacturing is slower than in the earlier period.

Employment in *marketing and sales occupations* is projected to increase by 2.3 million workers from 1998 to 2008, or 14.9 percent, considerably less than the 23.8-percent increase from 1988 to 1998. The group's projected share of total employment will increase slightly by 2008. The reduced job growth for marketing and sales workers is attributable, in part, to a projected slowdown of the employment growth rate in the wholesale and retail trade sectors, some of which is attributable to the increased use of automated sales systems, which decreases the overall demand for labor. Substantial employment growth among marketing and sales workers is expected in the services industry, including public education and State and local government hospitals (719,000 jobs); and an increase of 92,000 jobs for these workers is expected in transportation and public utilities. In finance, insurance, and real estate, employment among sales workers is expected to grow by 164,000 jobs by 2008, compared with an increase of only 105,000 jobs during the previous period.

The number of workers in *administrative support occupations, including clerical* is projected to increase by 2.2 million jobs from 1998 to 2008, about the same amount as in the previous 10-year period. However, because the projected 9.0-percent growth rate is considerably lower than the rate for all occupations, the share of total employment represented by these workers is projected to continue to decline, from 17.4 percent in 1998 to 16.6 percent by 2008. Nevertheless, with a projected employment level of 26.7 million workers in 2008, this group is expected to remain the largest major occupational group, as it was in both 1988 and 1998.

Several large detailed occupations within administrative support occupations, including clerical, are expected to continue to decline in the coming period, as they also did from 1988 to 1998, as these occupations continue to be affected by technological change such as office automation. Among these occupations are bookkeeping, accounting, and auditing clerks, and word processors and typists.

Occupations that involve a great deal of contact with people, and therefore are less affected by changing technology, are projected to have average or higher-than-average rates of growth and substantial numerical job gains. These occupations include adjusters, investigators, and collectors (302,000 jobs); receptionists and information clerks (305,000 jobs); office and administrative support supervisors and managers (313,000 jobs); and teacher assistants (375,000 jobs). Eighty-five percent of the projected increase (2.2 million jobs) for ad-

ministrative support occupations, including clerical, is in the services industry, including public education and State and local government hospitals, an even greater proportion than its 72-percent proportion of the increase in the earlier period. Employment is projected to decline by 158,000 in manufacturing, a smaller decline than the 392,000 decrease between 1988 and 1998.

Employment in *service occupations* is projected to increase by 3.9 million, or 17.1 percent, the second largest numerical gain and third highest rate of growth among the major occupational groups. Employment in the group increased by about the same amount in the 1988–98 period. The proportion of total employment represented by workers in service occupations is expected to continue to increase, as it has since 1988.

More than half of the nearly 4 million additional service jobs projected through 2008 are in the rapidly growing services industry, including public education and State and local government hospitals, led by business services, health services, and social services. Retail trade and government, except State and local education and hospitals are expected to provide more than 1.5 million service jobs. Health service occupations, which grew by more than 450,000 workers from 1988 to 1998, are projected to have an even greater increase (676,000 jobs) than in the previous period.

Other occupational subgroups with large projected job increases include food preparation and service occupations (1.1 million jobs); personal service occupations (894,000 jobs); protective service occupations (717,000 jobs); and cleaning and building service occupations, except private household (408,000 jobs). Employment in private household occupations is expected to continue its long-term decline, losing 178,000 jobs by 2008. Finally, the number of self-employed service workers is expected to increase by 222,000 jobs, to 1.5 million jobs by 2008. Opportunities will be especially plentiful among cleaning and building service occupations, except private household; child care workers; and hairdressers, hairstylists, and cosmetologists.

*Agriculture, forestry, fishing, and related occupations* are projected to grow by only 71,000 jobs in the coming period, after adding 212,000 jobs over the 1988–98 period. Within this major group, job losses are projected for farmers (all of whom are self-employed or unpaid family workers) and farm workers. In contrast, increases are projected for landscaping, grounds-keeping, nursery, greenhouse, and lawn service occupations. Agriculture, forestry, fishing, and related workers are expected to continue to decline as a share of total employment, remaining the smallest of the major occupational groups through 2008.

Employment in *precision production, craft, and repair occupations* is projected to increase by nearly 1.3 million jobs, or 8.0 percent from 1998 to 2008. This slower-than-average growth rate is a continuation of the 1988–98 trend, in which

employment grew by 9.0 percent, adding 1.3 million jobs. These workers are expected to account for 10.5 percent of total employment in 2008—down from 11.1 percent in 1998. The largest job growth in this group is expected among mechanics, installers, and repairers (588,000 jobs); construction trades workers (390,000 jobs); blue-collar worker supervisors (196,000 jobs); and plant and system occupations (28,000 jobs). These job categories also registered large increases during the previous 10 years. The number of self-employed precision production, craft, and repair workers is expected to grow to more than 1.9 million workers, an increase of nearly 65,000 jobs, the majority of which will be for blue-collar worker supervisors; construction trades workers; and mechanics, installers, and repairers.

The precision production occupations—more than 70 percent of which are in manufacturing—are expected to increase by about 39,000 jobs, a turnaround from their decrease of more than 200,000 jobs from 1988 to 1998. A small decline in employment of these workers in manufacturing is expected to be more than offset by increases in the services industry, including public education and State and local government hospitals—primarily in personnel supply services firms who provide temporary help services. Presumably, many of these employees actually work in manufacturing plants.

The number of *operators, fabricators, and laborers* is expected to increase by 1.8 million workers, or 9.4 percent, from 1998 to 2008. In the previous 10-year period, this group of workers increased by 1.6 million, or 9.3 percent. The proportion of total employment represented by these workers is projected to decline from 13.2 percent to 12.7 percent over the period. Most of the job growth in this group is expected among transportation and material moving machine and vehicle operators (especially truck drivers, with an increase of 507,000 jobs); helpers, laborers, and material movers, hand (especially hand packers and packagers, with an increase of 213,000 jobs); and hand workers, including assemblers and fabricators.

The manufacturing sector is expected to experience a small loss of 33,000 jobs for operators, fabricators, and laborers, largely resulting from continued automation as well as the overall projected decline in manufacturing employment. However, the projected declines will be more than offset by the gains in the services industry, including public education and State and local government hospitals; transportation; and wholesale and retail jobs. Jobs for these workers in the trade sector, which increased by 377,000 jobs from 1988 to 1998, are projected to increase more slowly in the coming period (309,000 jobs, three-fifths of which will be for truck drivers), largely as a result of the increased utilization of automated material moving equipment.

## Detailed occupations

BLS has developed projections for more than 500 detailed occupations. The growth rates range from an increase of 108

percent for computer engineers to a decline of 60 percent for typesetting and composing machine operators and tenders. (See table 2.) In the following section, projected occupational employment is analyzed from two perspectives: percent change and numerical change, because one can be large and the other small, depending on the size of employment in the base year. The employment of physician assistants, for example, is projected to grow very rapidly over the 1998–2008 period (48 percent), while adding only 32,000 jobs. In contrast, the employment of elementary school teachers, which is expected to grow by only 12 percent, will increase by 205,000 jobs—more than 6 times as many jobs as physician assistants.

An interesting comparison exists between the total increase in employment from those occupations that are projected as the fastest growing (table 3) and the increase from those projected to account for the largest numerical increase (table 4). The first group accounts for less than 18 percent of the projected overall growth in employment, while the second group accounts for nearly half of the increase. (It should be noted that several occupations, including systems analysts, personal care and home health aides, computer support specialists, computer engineers, social workers, and correctional officers are included in both of the groups.)

Educational and training requirements and earnings of workers are quite varied among the 30 occupations that are projected to grow the fastest, as well as among the 30 occupations with the largest numerical increases. (See exhibit 1 for a description of the education and training categories used in this article.) Seventy percent of the 30 fastest-growing occupations generally require postsecondary education or training; three of the top four require at least a bachelor's degree and had median earnings in 1997 that were in the top earnings quartile. A third of the occupations with the largest job growth require some type of postsecondary education or training. The remainder of the occupations on the two lists generally are trained on the job, and most earned less than the median for all wage and salary workers in 1997. Although employers will continue to require workers at all levels of education and training, those with the most education usually will have more options in the job market and better prospects for obtaining higher-paying jobs.

*Fastest growing occupations.* Two-thirds of the 30 fastest-growing occupations are in computer or health-related occupations, with the rest in a variety of areas such as the social services, legal, natural science, or financial areas.

The demand for computer-related occupations will continue to increase as a result of the rapid advances in computer technology and the continuing demand for new computer applications, including Internet, Intranet, and World Wide Web applications. The top five occupations on the list—computer engineers, computer support specialists, systems analysts, database administrators, and desktop publishing specialists—are

all heavily involved in these activities. Three of these occupations—systems analysts, computer support specialists, and computer engineers—are also among the occupations with the largest projected numerical job growth through 2008. (See table 4). These occupations experienced both very fast growth rates and large numerical increases in employment in the earlier period (1988–98) as well. Rapid growth also is expected for data processing equipment repairers and for electronic semiconductor processors. Electronic semiconductor processors produce the chips used in computers and many other products currently on the market.

Fourteen of the 30 fastest growing occupations are related to health care. Most of these health-related occupations also grew rapidly in the earlier period. Health care occupations have grown rapidly in the past and will continue to do so in the coming period, mainly due to several factors, such as an aging population that requires more health care, a wealthier population that can afford better health care, and advances in medical technology that increase the demand for their use. However, efforts to cut the rapid growth of spending on health care—both by private medical insurers and health maintenance organizations and by government efforts to reduce the growth of medicare and medicaid reimbursements—will act to restrict the growth of health care occupations. In particular, provisions of the Balanced Budget Act of 1997 will act to restrict growth in some health care occupations such as physical and occupational therapists due to caps on medicare payments, at least through 2003. Some health-related occupations, however, are projected to grow rapidly as a result of efforts to reduce health care costs. For example, employment among physician assistants is expected to grow rapidly because these workers perform duties that formerly had been performed only by physicians, who generally are paid considerably more than physician assistants.

Personal care and home health aides is the seventh most rapidly growing occupation and also is among the occupations expected to provide the most job growth. Personal care and home health aides provide personal and physical care for an increasing number of elderly people and for patients who are recovering from surgery and other serious health conditions. They also perform a variety of light housekeeping tasks for those in need of home care. Employment in this occupation is expected to increase because the number of people in their seventies and older who will need the services of these workers will rise substantially. Also, there will be an increasing reliance on home care for patients of all ages. This trend reflects several developments, including efforts to contain costs by moving patients out of hospitals and nursing facilities as quickly as possible, a growing recognition that treatment can be more effective in familiar surroundings than in clinical surroundings, and the development and improvement of medical technologies for in-home treatment.

**Table 2.** Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998-2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Total, all occupations .....	140,514	160,795	100.0	100.0	20,281	14.4	54,622
Executive, administrative, and managerial occupations .....	14,770	17,196	10.5	10.7	2,426	16.4	5,107
Managerial and administrative occupations .....	10,139	11,823	7.2	7.4	1,684	16.6	3,484
Administrative services managers .....	364	430	.3	.3	66	18.1	130
Advertising, marketing, promotions, public relations, and sales managers ..	485	597	.3	.4	112	23.0	179
Communication, transportation, and utilities operations managers .....	196	234	.1	.1	38	19.3	72
Construction managers .....	270	308	.2	.2	38	14.0	85
Education administrators .....	447	505	.3	.3	58	13.0	171
Engineering, natural science, and computer and information systems managers .....	326	468	.2	.3	142	43.5	199
Financial managers .....	693	791	.5	.5	97	14.0	207
Food service and lodging managers ....	595	691	.4	.4	97	16.3	201
Funeral directors and morticians .....	28	32	.0	.0	4	16.1	9
General managers and top executives .	3,362	3,913	2.4	2.4	551	16.4	1,140
Government chief executives and legislators .....	80	82	.1	.1	2	2.8	22
Human resources managers .....	230	274	.2	.2	45	19.4	98
Industrial production managers .....	208	207	.1	.1	-2	-9	36
Medical and health services managers .	222	297	.2	.2	74	33.3	114
Postmasters and mail superintendents .	26	27	.0	.0	1	3.0	5
Property, real estate, and community association managers .....	315	359	.2	.2	43	13.7	86
Purchasing managers .....	176	188	.1	.1	13	7.1	52
All other managers and administrators .	2,114	2,420	1.5	1.5	305	14.4	678
Management support occupations .....	4,631	5,374	3.3	3.3	743	16.0	1,623
Accountants and auditors .....	1,080	1,202	.8	.7	122	11.3	289
Assessors and real estate appraisers ..	70	78	.1	.0	8	11.4	23
Assessors .....	22	25	.0	.0	3	11.8	8
Real estate appraisers .....	48	53	.0	.0	5	11.2	15
Budget analysts .....	59	67	.0	.0	8	13.7	21
Buyers and purchasing agents .....	371	396	.3	.2	25	6.8	120
Purchasing agents and buyers, farm .	29	30	.0	.0	1	5.0	9
Purchasing agents, except wholesale, retail, and farm products .....	224	248	.2	.2	24	10.8	82
Wholesale and retail buyers, except farm products .....	118	118	.1	.1	0	-4	29
Construction and building inspectors ....	68	79	.0	.0	11	15.7	28
Cost estimators .....	152	171	.1	.1	20	13.0	38
Credit analysts .....	42	50	.0	.0	8	19.9	18
Employment interviewers, private or public employment service .....	66	74	.0	.0	8	12.9	26
Human resources, training, and labor relations specialists .....	367	433	.3	.3	66	17.9	163
Inspectors and compliance officers, except construction .....	176	195	.1	.1	19	10.5	51
Insurance claims adjusters, appraisers, examiners, and investigators .....	239	284	.2	.2	45	18.6	84
Insurance claims adjusters, examiners, and investigators .....	229	272	.2	.2	43	18.7	81
Claims examiners, property and casualty insurance .....	49	55	.0	.0	6	12.5	14
Insurance adjusters, examiners, and investigators .....	180	217	.1	.1	37	20.4	67
Insurance appraisers, auto damage ...	10	12	.0	.0	2	16.0	3
Insurance underwriters .....	97	100	.1	.1	3	2.7	30
Loan counselors and officers .....	227	276	.2	.2	48	21.2	98
Management analysts .....	344	442	.2	.3	98	28.4	125
Tax examiners, collectors, and revenue agents .....	62	66	.0	.0	3	5.4	17

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998-2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Tax preparers .....	79	95	0.1	0.1	15	19.3	33
All other management support workers .....	1,130	1,366	.8	.8	236	20.9	459
Professional specialty occupations .....	19,802	25,145	14.1	15.6	5,343	27.0	9,148
Engineers .....	1,462	1,752	1.0	1.1	290	19.9	610
Aerospace engineers .....	53	58	.0	.0	5	8.8	13
Chemical engineers .....	48	53	.0	.0	5	9.5	15
Civil engineers .....	195	236	.1	.1	41	20.9	78
Electrical and electronics engineers .....	357	450	.3	.3	93	25.9	169
Industrial engineers, except safety engineers .....	126	142	.1	.1	16	12.8	34
Materials engineers .....	20	21	.0	.0	2	9.0	6
Mechanical engineers .....	220	256	.2	.2	36	16.4	79
Mining engineers, including mine safety engineers .....	4	4	.0	.0	-1	-12.6	1
Nuclear engineers .....	12	12	.0	.0	1	5.8	3
Petroleum engineers .....	12	12	.0	.0	0	-3.6	3
All other engineers .....	415	509	.3	.3	94	22.6	208
Architects and surveyors .....	163	185	.1	.1	23	13.8	50
Architects, except landscape and naval .....	99	118	.1	.1	19	18.9	33
Landscape architects .....	22	25	.0	.0	3	14.5	6
Surveyors, cartographers, and photogrammetrists .....	41	42	.0	.0	1	1.4	10
Life scientists .....	173	219	.1	.1	45	26.2	87
Agricultural and food scientists .....	21	24	.0	.0	2	10.9	8
Biological scientists .....	81	109	.1	.1	28	35.0	45
Conservation scientists and foresters .....	39	46	.0	.0	7	17.9	17
Medical scientists .....	31	39	.0	.0	8	24.6	17
All other life scientists .....	1	1	.0	.0	0	16.5	0
Computer, mathematical, and operations research occupations .....	1,653	3,182	1.2	2.0	1,529	92.5	1,664
Actuaries .....	16	17	.0	.0	1	7.1	3
Computer systems analysts, engineers, and scientists .....	1,530	3,052	1.1	1.9	1,522	99.4	1,625
Computer engineers and scientists .....	914	1,858	.7	1.2	944	103.4	1,010
Computer engineers .....	299	622	.2	.4	323	107.9	341
Computer support specialists .....	429	869	.3	.5	439	102.3	466
Database administrators .....	87	155	.1	.1	67	77.2	82
All other computer scientists .....	97	212	.1	.1	115	117.5	121
Systems analysts .....	617	1,194	.4	.7	577	93.6	616
Statisticians .....	17	17	.0	.0	0	2.3	3
Mathematicians and all other mathematical scientists .....	14	13	.0	.0	-1	-5.5	2
Operations research analysts .....	76	83	.1	.1	7	8.7	32
Physical scientists .....	200	229	.1	.1	29	14.7	77
Atmospheric scientists .....	8	10	.0	.0	1	14.6	3
Chemists .....	96	110	.1	.1	13	13.9	35
Geologists, geophysicists, and oceanographers .....	44	51	.0	.0	7	15.5	18
Physicists and astronomers .....	18	18	.0	.0	0	2.2	5
All other physical scientists .....	33	41	.0	.0	8	22.7	16
Religious workers .....	304	356	.2	.2	53	17.3	106
Clergy .....	149	169	.1	.1	20	13.4	49
Directors, religious activities and education .....	112	140	.1	.1	28	25.1	46
All other religious workers .....	43	48	.0	.0	5	10.7	11
Social scientists .....	321	365	.2	.2	44	13.8	107
Economists and marketing research analysts .....	70	83	.0	.1	13	18.4	27
Psychologists .....	166	185	.1	.1	19	11.4	49

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Urban and regional planners .....	35	41	0.0	0.0	6	17.4	13
All other social scientists .....	50	56	.0	.0	6	12.7	17
Social and recreation workers .....	1,303	1,797	.9	1.1	494	37.9	749
Recreation workers .....	241	287	.2	.2	46	19.2	110
Residential counselors .....	190	278	.1	.2	88	46.3	131
Social and human service assistants .....	268	410	.2	.3	141	52.7	211
Social workers .....	604	822	.4	.5	218	36.1	296
Lawyers and judicial workers .....	752	871	.5	.5	119	15.8	205
Judges, magistrates, and other judicial workers .....	71	73	.1	.0	2	2.9	13
Lawyers .....	681	798	.5	.5	117	17.2	192
Teachers, librarians, and counselors .....	6,939	8,248	4.9	5.1	1,309	18.9	2,832
Teachers, preschool and kindergarten .....	529	645	.4	.4	116	22.0	229
Teachers, preschool .....	346	437	.2	.3	92	26.5	165
Teachers, kindergarten .....	184	208	.1	.1	25	13.4	64
Teachers, elementary school .....	1,754	1,959	1.2	1.2	205	11.7	610
Teachers, secondary school .....	1426	1749	1.0	1.1	322	22.6	778
Teachers, special education .....	406	543	.3	.3	137	33.8	172
College and university faculty .....	865	1,061	.6	.7	195	22.6	435
Other teachers and instructors .....	956	1,139	.7	.7	183	19.1	284
Farm and home management advisors .....	10	10	.0	.0	0	-2.2	1
Instructors and coaches, sports and physical training .....	359	460	.3	.3	102	28.4	140
Adult and vocational education teachers .....	588	669	.4	.4	81	13.8	143
Instructors, adult (nonvocational) education .....	168	203	.1	.1	35	20.9	53
Teachers and instructors, vocational education and training .....	420	466	.3	.3	46	11.0	90
All other teachers and instructors .....	644	739	.5	.5	95	14.7	183
Librarians, archivists, curators, and related workers .....	175	186	.1	.1	10	5.8	55
Archivists, curators, museum technicians, and conservators .....	23	26	.0	.0	3	12.6	9
Librarians .....	152	159	.1	.1	7	4.8	46
Counselors .....	182	228	.1	.1	46	25.0	87
Health diagnosing occupations .....	892	1,049	.6	.7	157	17.6	312
Chiropractors .....	46	57	.0	.0	11	22.8	20
Dentists .....	160	165	.1	.1	5	3.1	38
Optometrists .....	38	42	.0	.0	4	10.6	12
Physicians .....	577	699	.4	.4	122	21.2	212
Podiatrists .....	14	15	.0	.0	1	10.5	4
Veterinarians .....	57	71	.0	.0	14	24.7	26
Health assessment and treating occupations .....	2,860	3,531	2.0	2.2	671	23.5	1,158
Dietitians and nutritionists .....	54	64	.0	.0	10	19.1	21
Pharmacists .....	185	199	.1	.1	14	7.3	64
Physician assistants .....	66	98	.0	.1	32	48.0	43
Registered nurses .....	2,079	2,530	1.5	1.6	451	21.7	794
Therapists .....	476	640	.3	.4	164	34.6	236
Occupational therapists .....	73	98	.1	.1	25	34.2	36
Physical therapists .....	120	161	.1	.1	41	34.0	59
Radiation therapists .....	12	14	.0	.0	2	16.7	4
Recreational therapists .....	39	44	.0	.0	5	13.4	11
Respiratory therapists .....	86	123	.1	.1	37	42.6	50
Speech-language pathologists and audiologists .....	105	145	.1	.1	40	38.5	56
All other therapists .....	40	54	.0	.0	14	35.7	20
Writers, artists, and entertainers .....	1,996	2,409	1.4	1.5	413	20.7	834

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998-2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Actors, directors, and producers .....	160	198	0.1	0.1	38	23.8	74
Announcers .....	60	58	.0	.0	-3	-4.3	14
Artists and commercial artists .....	308	388	.2	.2	79	25.7	143
Athletes, coaches, umpires, and related workers .....	52	66	.0	.0	14	27.9	33
Dancers and choreographers .....	29	33	.0	.0	4	13.6	10
Designers .....	423	532	.3	.3	110	25.9	171
Designers, except interior designers ..	335	426	.2	.3	91	27.1	140
Interior designers .....	53	68	.0	.0	15	27.2	22
Merchandise displayers and window dressers .....	34	38	.0	.0	4	12.7	9
Musicians, singers, and related workers .....	273	314	.2	.2	41	14.8	93
News analysts, reporters, and correspondents .....	67	68	.0	.0	2	2.8	22
Photographers and camera operators .....	161	176	.1	.1	15	9.2	39
Camera operators, television, motion picture, video .....	11	15	.0	.0	3	29.0	5
Photographers .....	149	161	.1	.1	12	7.7	34
Public relations specialists .....	122	152	.1	.1	30	24.6	62
Writers and editors, including technical writers .....	341	424	.2	.3	83	24.4	173
All other professional workers .....	785	952	.6	.6	166	21.2	355
Technicians and related support occupations .....	4,949	6,048	3.5	3.8	1,098	22.2	2,202
Health technicians and technologists .....	2,447	3,063	1.7	1.9	616	25.2	1,122
Cardiovascular technologists and technicians .....	21	29	.0	.0	8	39.4	13
Clinical laboratory technologists and technicians .....	313	366	.2	.2	53	17.0	93
Dental hygienists .....	143	201	.1	.1	58	40.5	90
EKG technicians .....	12	10	.0	.0	-3	-23.1	3
Electroneurodiagnostic technologists .....	5	6	.0	.0	0	5.9	2
Emergency medical technicians and paramedics .....	150	197	.1	.1	47	31.6	84
Licensed practical and licensed vocational nurses .....	692	828	.5	.5	136	19.7	284
Medical records and health information technicians .....	92	133	.1	.1	41	43.9	63
Nuclear medicine technologists .....	14	16	.0	.0	2	11.6	4
Opticians, dispensing .....	71	81	.1	.1	10	13.8	19
Pharmacy technicians .....	109	126	.1	.1	17	15.7	44
Psychiatric technicians .....	66	73	.0	.0	7	10.9	16
Radiologic technologists and technicians .....	162	194	.1	.1	32	20.1	55
Surgical technologists .....	54	77	.0	.0	23	41.8	36
Veterinary technologists and technicians .....	32	37	.0	.0	5	16.2	12
All other health professionals and paraprofessionals .....	510	688	.4	.4	178	35.0	302
Engineering and science technicians and technologists .....	1,351	1,525	1.0	.9	175	12.9	485
Engineering technicians .....	771	897	.5	.6	126	16.3	301
Electrical and electronic technicians and technologists .....	335	391	.2	.2	56	16.8	125
All other engineering technicians and technologists .....	437	506	.3	.3	70	15.9	176
Drafters .....	283	301	.2	.2	18	6.4	86
Science and mathematics technicians .....	227	243	.2	.2	16	7.0	68

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Surveying and mapping technicians .....	69	84	0.0	0.1	15	21.8	31
Technicians, except health and engineering and science .....	1,152	1,460	.8	.9	308	26.7	595
Aircraft pilots and flight engineers .....	94	99	.1	.1	6	5.9	26
Air traffic controllers .....	30	30	.0	.0	1	2.3	9
Broadcast and sound technicians .....	37	39	.0	.0	2	6.0	12
Computer programmers .....	648	839	.5	.5	191	29.5	392
Legal assistants and technicians, except clerical .....	252	346	.2	.2	94	37.4	117
Paralegals and legal assistants .....	136	220	.1	.1	84	62.0	96
Title examiners, abstractors, and searchers .....	30	29	.0	.0	0	-0.6	2
All other legal assistants, including law clerks .....	86	96	.1	.1	10	11.6	18
Library technicians .....	72	85	.1	.1	13	18.2	33
All other technicians .....	20	21	.0	.0	1	4.1	6
Marketing and sales occupations .....	15,341	17,627	10.9	11.0	2,287	14.9	6,810
Cashiers .....	3,198	3,754	2.3	2.3	556	17.4	1,950
Counter and rental clerks .....	469	577	.3	0.4	108	23.1	311
Insurance sales agents .....	387	396	.3	.2	9	2.2	97
Marketing and sales worker supervisors .....	2,584	2,847	1.8	1.8	263	10.2	601
Models, demonstrators, and product promoters .....	92	121	.1	.1	30	32.3	54
Parts salespersons .....	300	303	.2	.2	4	1.2	90
Real estate agents and brokers .....	347	382	.2	.2	34	9.8	104
Brokers, real estate .....	63	71	.0	.0	8	13.5	21
Sales agents, real estate .....	285	310	.2	.2	26	9.0	83
Retail salespersons .....	4,056	4,620	2.9	2.9	563	13.9	1,938
Sales engineers .....	79	92	.1	.1	12	15.7	28
Securities, commodities, and financial services sales agents .....	303	427	.2	.3	124	41.0	147
Travel agents .....	138	163	.1	.1	25	18.4	54
All other sales and related workers .....	3,388	3,945	2.4	2.5	558	16.5	1,436
Administrative support occupations, including clerical .....	24,461	26,659	17.4	16.6	2,198	9.0	7,463
Adjusters, investigators, and collectors .....	1,237	1,540	.9	1.0	302	24.4	497
Adjustment clerks .....	479	642	.3	.4	163	34.0	194
Bill and account collectors .....	311	420	.2	.3	110	35.3	192
Insurance claims, examining and policy processing clerks .....	339	377	.2	.2	38	11.3	88
Insurance claims clerks .....	160	183	.1	.1	23	14.5	50
Insurance examining clerks .....	10	11	.0	.0	2	17.3	3
Insurance policy processing clerks .....	170	183	.1	.1	13	7.9	35
Welfare eligibility workers and interviewers .....	109	100	.1	.1	-8	-7.6	23
Communications equipment operators .....	297	252	.2	.2	-46	-15.4	65
Telephone operators .....	261	220	.2	.1	-41	-15.6	57
Central office operators .....	23	19	.0	.0	-4	-16.6	5
Directory assistance operators .....	23	16	.0	.0	-7	-31.1	5
Switchboard operators .....	214	185	.2	.1	-30	-13.9	47
All other communications equipment operators .....	36	32	.0	.0	-5	-13.6	8
Computer operators .....	251	187	.2	.1	-64	-25.5	36
Peripheral equipment operators .....	27	17	.0	.0	-10	-37.6	4
Computer operators, except peripheral equipment .....	224	170	.2	.1	-54	-24.1	32
Information clerks .....	1,910	2,296	1.4	1.4	386	20.2	817

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Hotel, motel, and resort desk clerks.....	159	180	0.1	0.1	21	13.5	82
Interviewing clerks, except personnel and social welfare .....	128	158	.1	.1	30	23.3	71
New accounts clerks, banking .....	111	127	.1	.1	16	14.7	52
Receptionists and information clerks .....	1,293	1,599	.9	1.0	305	23.6	553
Reservation and transportation ticket agents and travel clerks .....	219	232	.2	.1	13	6.0	59
Mail clerks and messengers .....	247	270	.2	.2	23	9.2	81
Couriers and messengers .....	120	130	.1	.1	11	8.8	39
Mail clerks, except mail machine operators and postal service .....	128	140	.1	.1	12	9.5	42
Postal clerks and mail carriers .....	405	434	.3	.3	30	7.3	135
Postal mail carriers .....	332	357	.2	.2	25	7.4	118
Postal service clerks .....	73	78	.1	.0	5	6.8	17
Material recording, scheduling, dispatching, and distributing occupations .....	4,183	4,382	3.0	2.7	199	4.8	895
Dispatchers .....	248	278	.2	.2	30	12.2	70
Dispatchers, except police, fire, and ambulance .....	163	186	.1	.1	23	14.4	50
Dispatchers, police, fire, and ambulance .....	85	92	.1	.1	7	8.0	21
Meter readers, utilities .....	50	51	.0	.0	0	.4	13
Procurement clerks .....	58	49	.0	.0	-9	-14.8	9
Production, planning, and expediting clerks .....	248	249	.2	.2	1	.4	30
Shipping, receiving, and traffic clerks .....	1,000	1,031	.7	.6	31	3.1	198
Stock clerks and order fillers .....	2,331	2,462	1.7	1.5	131	5.6	504
Weighers, measurers, checkers, and samplers, recordkeeping .....	51	51	.0	.0	1	1.5	14
All other material recording, scheduling, and distribution workers .....	196	210	.1	.1	13	6.8	58
Records processing occupations .....	3,731	3,775	2.7	2.3	44	1.2	943
Advertising clerks .....	14	14	.0	.0	1	4.4	4
Brokerage clerks .....	77	98	.1	.1	22	28.4	32
Correspondence clerks .....	25	28	.0	.0	3	12.2	9
File clerks .....	272	298	.2	.2	26	9.6	121
Financial records processing occupations .....	2,698	2,653	1.9	1.7	-44	-1.6	561
Billing, cost, and rate clerks .....	342	392	.2	.2	50	14.6	118
Billing and posting clerks and machine operators .....	107	104	.1	.1	-3	-2.6	21
Bookkeeping, accounting, and auditing clerks .....	2,078	1,997	1.5	1.2	-81	-3.9	388
Payroll and timekeeping clerks .....	172	161	.1	.1	-11	-6.2	34
Library assistants and bookmobile drivers .....	127	148	.1	.1	21	16.5	82
Order clerks .....	362	378	.3	.2	17	4.6	103
Human resources assistants, except payroll and timekeeping .....	142	145	.1	.1	3	2.0	30
Statement clerks .....	16	12	.0	.0	-3	-22.3	2
Secretaries, stenographers, and typists .....	3,764	3,744	2.7	2.3	-19	-.5	703
Court reporters, medical transcriptionists, and stenographers .....	110	121	.1	.1	11	9.7	29
Secretaries .....	3,195	3,258	2.3	2.0	63	2.0	585
Legal secretaries .....	285	322	.2	.2	37	13.0	83

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Medical secretaries .....	219	246	0.2	0.2	26	12.0	62
Secretaries, except legal and medical .....	2,690	2,691	1.9	1.7	0	.0	439
Word processors and typists .....	459	365	.3	.2	-93	-20.4	89
Other clerical and administrative support workers .....	8,436	9,780	6.0	6.1	1,344	15.9	3,290
Bank tellers .....	560	529	.4	.3	-31	-5.5	240
Court, municipal, and license clerks .....	100	112	.1	.1	12	11.6	28
Court clerks .....	51	57	.0	.0	6	10.8	14
License clerks .....	24	27	.0	.0	3	13.1	7
Municipal clerks .....	25	28	.0	.0	3	11.9	7
Credit and loan authorizers, checkers, and clerks .....	254	271	.2	.2	17	6.7	47
Credit authorizers .....	17	15	.0	.0	-2	-10.7	2
Credit checkers .....	41	42	.0	.0	1	1.5	3
Loan and credit clerks .....	179	200	.1	.1	21	11.8	40
Loan interviewers .....	16	14	.0	.0	-3	-17.0	2
Data entry keyers .....	435	474	.3	.3	39	9.0	72
Duplicating, mail, and other office machine operators .....	197	201	.1	.1	4	1.9	62
Office and administrative support supervisors and managers .....	1,611	1,924	1.1	1.2	313	19.4	675
Office clerks, general .....	3,021	3,484	2.1	2.2	463	15.3	1,300
Proofreaders and copy markers .....	41	34	.0	.0	-7	-17.1	13
Statistical clerks .....	72	69	.1	.0	-3	-4.5	10
Teacher assistants .....	1,192	1,567	.8	1.0	375	31.5	512
All other clerical and administrative support workers .....	953	1,116	.7	.7	162	17.0	332
Service occupations .....	22,548	26,401	16.0	16.4	3,853	17.1	11,112
Cleaning and building service occupations, except private household .....	3,623	4,031	2.6	2.5	408	11.3	1,164
Institutional cleaning supervisors .....	87	97	.1	.1	9	10.5	30
Janitors and cleaners, including maids and housekeeping cleaners .....	3,184	3,549	2.3	2.2	365	11.5	1,027
Pest control workers .....	52	65	.0	.0	13	25.4	25
All other cleaning and building service workers .....	300	320	.2	.2	20	6.7	83
Food preparation and service occupations .....	8,735	9,831	6.2	6.1	1,096	12.6	5,159
Chefs, cooks, and other kitchen workers .....	3,306	3,748	2.4	2.3	442	13.4	1,669
Cooks, except short order .....	1,373	1,560	1.0	1.0	187	13.6	545
Bakers, bread and pastry .....	171	200	.1	.1	28	16.6	73
Cooks, institution or cafeteria .....	418	431	.3	.3	12	2.9	121
Cooks, restaurant .....	783	929	.6	.6	146	18.7	351
Cooks, short order and fast food .....	677	801	.5	.5	124	18.4	301
Food preparation workers .....	1,256	1,387	.9	.9	131	10.4	823
Food and beverage service occupations .....	5,150	5,778	3.7	3.6	628	12.2	3,356
Bartenders .....	404	412	.3	.3	8	1.9	181
Dining room and cafeteria attendants and bar helpers .....	405	422	.3	.3	16	4.0	140
Food counter, fountain, and related workers .....	2,025	2,272	1.4	1.4	247	12.2	1,476
Hosts and hostesses, restaurant, lounge, or coffee shop .....	297	351	.2	.2	54	18.2	145
Waiters and waitresses .....	2,019	2,322	1.4	1.4	303	15.0	1,415
All other food preparation and service workers .....	280	306	.2	.2	26	9.4	134

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998-2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Health service occupations .....	2,309	2,984	1.6	1.9	676	29.3	1,064
Ambulance drivers and attendants, except EMTs .....	19	26	.0	.0	7	35.0	11
Dental assistants .....	229	325	.2	.2	97	42.2	131
Medical assistants .....	252	398	.2	.2	146	57.8	208
Nursing and psychiatric aides .....	1,461	1,794	1.0	1.1	332	22.7	536
Nursing aides, orderlies, and attendants .....	1,367	1,692	1.0	1.1	325	23.8	515
Psychiatric aides .....	95	102	.1	.1	7	7.7	20
Occupational therapy assistants and aides .....	19	26	.0	.0	7	39.8	12
Pharmacy aides .....	61	71	.0	.0	10	15.9	25
Physical therapy assistants and aides .....	82	118	.1	.1	36	43.7	56
All other health service workers .....	185	226	.1	.1	41	22.3	85
Personal service occupations .....	2,934	3,828	2.1	2.4	894	30.5	1,413
Amusement and recreation attendants .....	337	439	.2	.3	102	30.2	163
Baggage porters and bellhops .....	40	45	.0	.0	5	13.7	13
Child care workers .....	905	1,141	.6	.7	236	26.1	325
Barbers, cosmetologists, and related workers .....	723	796	.5	.5	73	10.0	264
Barbers .....	54	50	.0	.0	-4	-7.3	15
Hairdressers, hairstylists, and cosmetologists .....	605	667	.4	.4	62	10.2	218
Manicurists .....	49	62	.0	.0	13	26.0	25
Shampooers .....	15	17	.0	.0	2	14.5	6
Flight attendants .....	99	129	.1	.1	30	30.1	51
Personal care and home health aides .....	746	1,179	.5	.7	433	58.1	567
Ushers, lobby attendants, and ticket takers .....	84	99	.1	.1	15	17.6	30
Private household workers .....	928	751	.7	.5	-178	-19.1	276
Child care workers, private household cleaners and servants, private household .....	306	209	.2	.1	-97	-31.7	140
Cooks, private household .....	5	2	.0	.0	-2	-51.3	1
Housekeepers and butlers .....	17	10	.0	.0	-7	-42.4	4
Protective service occupations .....	2,769	3,486	2.0	2.2	717	25.9	1,490
Fire fighting occupations .....	314	334	.2	.2	20	6.4	103
Firefighters .....	239	251	.2	.2	11	4.7	70
Fire fighting and prevention supervisors .....	60	66	.0	.0	6	10.7	26
Fire inspection occupations .....	15	17	.0	.0	2	17.2	6
Law enforcement occupations .....	1,147	1,501	.8	.9	354	30.8	643
Correctional officers .....	383	532	.3	.3	148	38.7	253
Police and detectives .....	727	929	.5	.6	202	27.8	382
Detectives and criminal investigators ..	79	96	.1	.1	17	21.0	38
Police and detective supervisors .....	111	124	.1	.1	13	12.0	45
Police patrol officers .....	446	586	.3	.4	141	31.6	260
Sheriffs and deputy sheriffs .....	91	123	.1	.1	31	34.2	40
Other law enforcement occupations .....	37	40	.0	.0	3	9.4	8
Other protective service workers .....	1,308	1,651	.9	1.0	343	26.2	743
Crossing guards .....	54	57	.0	.0	2	4.0	18
Guards .....	1,027	1,321	.7	.8	294	28.6	550
Private detectives and investigators .....	61	76	.0	.0	15	24.3	30
All other protective service workers .....	166	198	.1	.1	32	19.0	145
All other service workers .....	1,249	1,490	.9	.9	241	19.3	546
Agriculture, forestry, fishing, and related occupations .....	4,435	4,506	3.2	2.8	71	1.6	1,356
Farm operators and managers .....	1,483	1,309	1.1	.8	-174	-11.7	232

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Farmers .....	1,308	1,135	0.9	0.7	-173	-13.2	203
Farm managers .....	175	174	.1	.1	-1	-.8	29
Farm workers .....	851	794	.6	.5	-57	-6.6	262
Fishers and fishing vessel operators .....	51	40	.0	.0	-11	-21.8	10
Captains and other officers, fishing vessels .....	11	9	.0	.0	-2	-18.6	2
Fishers .....	40	31	.0	.0	-9	-22.7	8
Forestry, conservation, and logging occupations .....	120	116	.1	.1	-4	-3.1	27
Forest and conservation workers .....	33	33	.0	.0	0	0.7	7
Timber cutting and logging occupations .....	87	83	.1	.1	-4	-4.6	20
Fallers and buckers .....	18	16	.0	.0	-2	-11.5	5
Logging equipment operators .....	56	55	.0	.0	-1	-2.0	12
All other timber cutting and related logging workers .....	13	12	.0	.0	-1	-6.0	3
Landscaping, groundskeeping, nursery, greenhouse, and lawn service occupations .....	1,285	1,548	.9	1.0	262	20.4	626
Laborers, landscaping and groundskeeping .....	1,130	1,364	.8	.8	234	20.7	572
Lawn service managers .....	86	104	.1	.1	17	20.0	24
Nursery and greenhouse managers .....	5	6	.0	.0	1	15.1	1
Pruners .....	45	50	.0	.0	5	12.1	19
Sprayers/applicators .....	19	23	.0	.0	4	23.6	10
Supervisors, farming, forestry, and agricultural related occupations .....	92	97	.1	.1	6	6.2	18
Veterinary assistants and nonfarm animal caretakers .....	181	223	.1	.1	42	23.2	68
Animal caretakers, except farm .....	137	166	.1	.1	30	21.6	49
Veterinary assistants .....	45	57	.0	.0	12	28.0	19
All other agricultural, forestry, fishing, and related workers .....	373	379	.3	.2	6	1.7	113
Precision production, craft, and repair occupations .....	15,619	16,871	11.1	10.5	1,252	8.0	5,051
Blue-collar worker supervisors .....	2,198	2,394	1.6	1.5	196	8.9	803
Construction trades .....	4,628	5,018	3.3	3.1	390	8.4	1,425
Boilermakers .....	18	19	.0	.0	0	1.6	5
Bricklayers, blockmasons, and stonemasons .....	157	176	.1	.1	19	12.3	51
Carpenters .....	1,071	1,145	.8	.7	74	6.9	361
Carpet, floor, and tile installers and finishers .....	138	147	.1	.1	8	6.0	40
Carpet installers .....	85	88	.1	.1	3	3.6	21
Hard tile setters .....	29	31	.0	.0	3	8.7	10
All other carpet, floor, and tile installers and finishers .....	25	28	.0	.0	3	11.0	9
Ceiling tile installers and acoustical carpenters .....	16	17	.0	.0	1	8.9	6
Concrete finishers, cement masons, and terrazzo workers .....	139	148	.1	.1	9	6.1	25
Construction equipment operators .....	321	346	.2	.2	25	7.7	76
Grader, bulldozer, and scraper operators .....	122	129	.1	.1	7	5.7	17
Operating engineers .....	126	135	.1	.1	10	7.9	32
Paving, surfacing, and tamping equipment operators .....	74	82	.1	.1	8	10.6	27
Drywall installers and finishers .....	163	175	.1	.1	12	7.5	34
Electricians .....	656	724	.5	.5	68	10.3	202
Elevator installers and repairers .....	30	33	.0	.0	4	12.2	11

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Glaziers .....	44	46	0.0	0.0	2	3.9	13
Hazardous materials removal workers ..	38	45	.0	.0	7	19.3	16
Highway maintenance workers .....	155	173	.1	.1	17	11.1	54
Insulation workers .....	67	72	.0	.0	5	7.5	26
Painters and paperhangers .....	476	517	.3	.3	41	8.6	162
Pipelayers and pipelaying fitters .....	57	60	.0	.0	3	4.9	16
Plasterers and stucco masons .....	40	47	.0	.0	7	17.1	17
Plumbers, pipefitters, and steamfitters .....	426	449	.3	.3	22	5.3	76
Roofers .....	158	177	.1	.1	19	12.0	73
Sheet metal workers and duct installers .....	230	262	.2	.2	32	14.1	89
Structural and reinforcing metal workers .....	81	87	.1	.1	6	8.0	28
All other construction trades workers .....	146	155	.1	.1	8	5.7	43
Extractive and related workers, including blasters .....	244	255	.2	.2	11	4.5	83
Oil and gas extraction occupations .....	69	63	.0	.0	-6	-9.0	17
Roustabouts, oil and gas .....	30	23	.0	.0	-6	-21.1	7
All other oil and gas extraction occupations .....	40	40	.0	.0	0	0.0	10
Mining, quarrying, and tunneling occupations .....	23	18	.0	.0	-4	-19.1	6
All other extraction and related workers .....	152	173	.1	.1	21	14.1	60
Mechanics, installers, and repairers .....	5,176	5,763	3.7	3.6	588	11.4	1,842
Electrical and electronic equipment mechanics, installers, and repairers ..	409	472	.3	.3	63	15.4	180
Computer, automated teller, and office machine repairers .....	138	184	.1	.1	46	33.7	70
Data processing equipment repairers .....	79	117	.1	.1	37	47.0	49
Office machine and cash register servicers .....	58	67	.0	.0	9	15.6	22
Telecommunications equipment mechanics, installers, and repairers .....	125	138	.1	.1	13	10.0	60
Radio mechanics .....	7	7	.0	.0	0	-1.4	2
Telephone equipment installers and repairers .....	69	75	.0	.0	6	8.8	37
Central office and PBX installers and repairers .....	44	59	.0	.0	14	32.3	29
Station installers and repairers, telephone .....	24	16	.0	.0	-8	-33.8	8
All other telecommunications equipment mechanics, installers, and repairers .....	49	56	.0	.0	7	13.3	21
Miscellaneous electrical and electronic equipment mechanics, installers, and repairers .....	146	150	.1	.1	4	2.7	50
Electronic home entertainment equipment repairers .....	36	31	.0	.0	-4	-11.9	10
Electronics repairers, commercial and industrial equipment .....	72	81	.1	.1	9	12.7	29
All other electrical and electronic equipment mechanics, installers, and repairers .....	39	38	.0	.0	-1	-2.4	10
Machinery mechanics, installers, and repairers .....	1,850	1,967	1.3	1.2	117	6.3	537
Industrial machinery mechanics .....	535	559	.4	.3	24	4.4	144
Maintenance repairers, general utility ..	1,232	1,327	.9	.8	95	7.7	370

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Millwrights .....	82	81	0.1	0.1	-2	-1.9	22
Vehicle and mobile equipment mechanics and repairers .....	1,612	1828	1.1	1.1	216	13.4	618
Aircraft mechanics and service technicians .....	133	147	.1	.1	14	10.4	40
Automotive body and related repairers .....	227	263	.2	.2	36	15.8	102
Automotive mechanics and service technicians .....	790	922	.6	.6	132	16.7	328
Bus and truck mechanics and diesel engine specialists .....	255	280	.2	.2	25	9.8	81
Farm equipment mechanics .....	49	47	.0	.0	-3	-5.2	13
Mobile heavy equipment mechanics ...	106	116	.1	.1	10	9.3	38
Motorcycle, boat, and small engine mechanics .....	52	54	.0	.0	2	4.7	16
Motorcycle mechanics .....	14	14	.0	.0	1	3.9	4
Small engine mechanics .....	38	40	.0	.0	2	5.0	12
Other mechanics, installers, and repairers .....	1,305	1,496	.9	.9	191	14.7	507
Bicycle repairers .....	11	13	.0	.0	2	22.6	5
Camera and photographic equipment repairers .....	9	10	.0	.0	1	8.2	3
Coin, vending, and amusement machine servicers and repairers .....	27	31	.0	.0	4	15.6	10
Heating, air conditioning, and refrigeration mechanics and installers .....	286	334	.2	.2	48	16.9	101
Home appliance and power tool repairers .....	51	54	.0	.0	3	5.6	18
Line installers and repairers .....	279	335	.2	.2	56	19.9	137
Electrical powerline installers and repairers .....	99	100	.1	.1	1	1.1	24
Telephone and cable TV line installers and repairers .....	180	235	.1	.1	55	30.3	113
Locksmiths and safe repairers .....	27	30	.0	.0	3	10.0	10
Medical equipment repairers .....	11	12	.0	.0	1	13.5	4
Musical instrument repairers and tuners .....	13	13	.0	.0	1	6.5	4
Precision instrument repairers .....	33	32	.0	.0	-1	-4.0	8
Riggers .....	11	11	.0	.0	0	0.5	3
Tire repairers and changers .....	83	92	.1	.1	9	10.4	45
Watch repairers .....	8	8	.0	.0	0	-4.2	2
All other mechanics, installers, and repairers .....	455	520	.3	.3	65	14.3	157
Production occupations, precision .....	2,971	3,010	2.1	1.9	39	1.3	774
Assemblers, precision .....	422	442	.3	.3	20	4.6	118
Aircraft assemblers, precision .....	17	20	.0	.0	3	19.3	7
Electrical and electronic equipment assemblers, precision .....	201	213	.1	.1	12	6.0	56
Electromechanical equipment assemblers, precision .....	50	52	.0	.0	3	5.7	14
Fitters, structural metal, precision .....	17	15	.0	.0	-2	-13.0	4
Machine builders and other precision machine assemblers .....	74	76	.1	.0	1	1.7	19
All other precision assemblers .....	64	66	.0	.0	2	3.7	18
Food workers, precision .....	310	303	.2	.2	-7	-2.4	78
Bakers, manufacturing .....	55	60	.0	.0	5	8.5	12
Butchers and meatcutters .....	216	201	.2	.1	-15	-7.1	51
All other precision food and tobacco workers .....	39	42	.0	.0	3	8.5	15

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Inspectors, testers, and graders, precision .....	689	667	0.5	0.4	-22	-3.2	153
Metal workers, precision .....	707	734	.5	.5	27	3.8	176
Jewelers and precious stone and metal workers .....	30	28	.0	.0	-2	-6.0	7
Machinists .....	426	452	.3	.3	26	6.2	111
Numerical control machine tool programmers .....	8	9	.0	.0	1	6.1	3
Shipfitters .....	9	8	.0	.0	0	-4.5	2
Tool and die makers .....	138	136	.1	.1	-2	-1.5	26
All other precision metal workers .....	97	101	.1	.1	4	4.0	27
Printing workers, precision .....	138	137	.1	.1	-1	-1.0	44
Bookbinders .....	7	6	.0	.0	-1	-15.2	2
Prepress printing workers, precision .....	115	114	.1	.1	0	-4	39
Camera operators .....	9	6	.0	.0	-3	-31.4	2
Compositors and typesetters, precision .....	14	11	.0	.0	-3	-18.9	2
Desktop publishing specialists .....	26	44	.0	.0	19	72.6	23
Film strippers, printing .....	23	15	.0	.0	-8	-33.0	4
Job printers .....	17	18	.0	.0	1	4.3	4
Paste-up workers .....	9	4	.0	.0	-5	-51.2	2
Photoengravers .....	3	1	.0	.0	-1	-51.5	0
Platemakers .....	15	14	.0	.0	-1	-5.2	2
All other printing workers, precision .....	17	17	.0	.0	0	.2	3
Textile, apparel, and furnishings workers, precision .....	234	226	.2	.1	-8	-3.3	49
Custom tailors and sewers .....	74	67	.1	.0	-6	-8.4	14
Patternmakers and layout workers, fabric and apparel .....	16	15	.0	.0	-1	-3.8	3
Shoe and leather workers and repairers, precision .....	23	19	.0	.0	-4	-17.6	5
Upholsterers .....	66	67	.0	.0	1	.9	14
All other precision textile, apparel, and furnishings workers .....	55	58	.0	.0	2	4.4	13
Woodworkers, precision .....	229	236	.2	.1	7	2.9	42
Cabinetmakers and bench carpenters .....	123	129	.1	.1	6	5.2	20
Furniture finishers .....	38	38	.0	.0	0	-1.0	9
Wood machinists .....	40	41	.0	.0	1	3.2	6
All other precision woodworkers .....	27	27	.0	.0	-1	-2.5	7
Other precision workers .....	242	266	.2	.2	25	10.2	85
Dental laboratory technicians, precision .....	44	44	.0	.0	0	1.0	9
Ophthalmic laboratory technicians .....	23	24	.0	.0	1	4.7	4
Photographic process workers, precision .....	18	19	.0	.0	1	7.0	8
All other precision workers .....	157	179	.1	.1	22	14.0	64
Plant and system occupations .....	403	431	.3	.3	28	6.9	153
Chemical plant and system operators .....	43	48	.0	.0	5	11.0	18
Electric power generating plant operators, distributors, and dispatchers .....	45	44	.0	.0	-1	-1.6	15
Power distributors and dispatchers .....	14	12	.0	.0	-2	-12.2	4
Power generating and reactor plant operators .....	31	32	.0	.0	1	3.1	11
Gas and petroleum plant and system occupations .....	38	33	.0	.0	-5	-12.6	12
Stationary engineers .....	31	29	.0	.0	-2	-5.7	7
Water and liquid waste treatment plant and system operators .....	98	112	.1	.1	14	14.2	37

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
All other plant and system operators ....	148	164	0.1	0.1	16	11.1	64
Operators, fabricators, and laborers .....	18,588	20,341	13.2	12.7	1,753	9.4	6,374
Machine setters, set-up operators, operators, and tenders .....	5,139	5,230	3.7	3.3	91	1.8	1,456
Numerical control machine tool operators and tenders, metal and plastic .....	88	108	.1	.1	20	22.6	39
Combination machine tool setters, set-up operators, operators, and tenders, metal and plastic .....	107	122	.1	.1	15	13.8	38
Machine tool cut and form setters, operators, and tenders, metal and plastic .....	726	690	.5	.4	-36	-4.9	188
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	42	34	.0	.0	-8	-18.3	9
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	75	68	.1	.0	-7	-9.6	20
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	72	66	.1	.0	-6	-8.4	16
Machine forming operators and tenders, metal and plastic .....	163	157	.1	.1	-6	-3.9	41
Machine tool cutting operators and tenders, metal and plastic .....	109	88	.1	.1	-22	-19.9	28
Punching machine setters and set-up operators, metal and plastic .....	47	44	.0	.0	-4	-7.5	9
All other machine tool setters, set-up operators, metal and plastic ..	218	235	.2	.1	17	7.7	65
Metal fabricating machine setters, operators, and related workers .....	167	178	.1	.1	10	6.2	51
Metal fabricators, structural metal products .....	46	49	.0	.0	3	7.5	14
Soldering and brazing machine operators and tenders .....	12	13	.0	.0	1	8.2	4
Welding machine setters, operators, and tenders .....	110	116	.1	.1	6	5.4	34
Metal and plastic processing machine setters, operators, and related workers .....	478	528	.3	.3	50	10.5	169
Electrolytic plating machine setters, set-up operators, operators, and tenders, metal and plastic .....	45	49	.0	.0	4	9.6	16
Foundry mold assembly and shake out workers .....	9	10	.0	.0	0	2.5	3
Furnace operators and tenders .....	23	22	.0	.0	-1	-5.0	4
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	23	22	.0	.0	-1	-4.1	6
Metal molding machine setters, set-up operators, operators, and tenders .....	58	63	.0	.0	5	9.0	20
Plastic molding machine setters, set-up operators, operators, and tenders .....	171	196	.1	.1	25	14.7	68
All other metal and plastic machine setters, operators, and related workers .....	148	166	.1	.1	18	11.9	55
Printing, binding, and related workers .....	406	410	.3	.3	4	1.1	106

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998-2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Bindery machine operators and set-up operators .....	90	100	0.1	0.1	10	11.5	26
Prepress printing workers, production .....	20	11	.0	.0	-9	-44.7	3
Photoengraving and lithographic machine operators and tenders .....	7	6	.0	.0	-1	-15.0	1
Typesetting and composing machine operators and tenders .....	13	5	.0	.0	-8	-59.8	2
Printing press operators .....	225	225	.2	.1	0	.2	61
Letterpress operators .....	10	8	.0	.0	-2	-18.2	2
Offset lithographic press operators ..	63	54	.0	.0	-9	-14.7	14
Printing press machine setters, operators and tenders .....	142	154	.1	.1	12	8.3	43
All other printing press setters and set-up operators .....	10	9	.0	.0	0	-4.5	2
Screen printing machine setters and set-up operators .....	28	29	.0	.0	1	3.0	7
All other printing, binding, and related workers .....	43	45	.0	.0	2	4.1	10
Textile and related setters, operators, and related workers .....	851	687	.6	.4	-164	-19.3	133
Extruding and forming machine operators and tenders, synthetic or glass fibers .....	33	35	.0	.0	3	7.9	8
Pressing machine operators and tenders, textile, garment, and related materials .....	69	66	.0	.0	-3	-4.0	11
Sewing machine operators, garment .....	369	257	.3	.2	-112	-30.3	50
Sewing machine operators, nongarment .....	137	140	.1	.1	3	2.5	22
Textile bleaching and dyeing machine operators and tenders .....	24	22	.0	.0	-2	-9.0	4
Textile draw-out and winding machine operators and tenders .....	192	141	.1	.1	-50	-26.3	32
Textile machine setters and set-up operators .....	28	26	.0	.0	-3	-9.6	5
Woodworking machine setters, operators, and other related workers .	143	130	.1	.1	-14	-9.4	37
Head sawyers and sawing machine operators and tenders, setters and set-up operators .....	64	61	.0	.0	-4	-5.7	19
Woodworking machine operators and tenders, setters and set-up operators .....	79	69	.1	.0	-10	-12.5	18
Other machine setters, set-up operators, operators, and tenders .....	2,172	2,377	1.5	1.5	205	9.4	693
Boiler operators and tenders, low pressure .....	16	14	.0	.0	-2	-11.0	3
Cement and gluing machine operators and tenders .....	32	27	.0	.0	-5	-15.6	8
Chemical equipment controllers, operators and tenders .....	100	111	.1	.1	11	11.4	35
Cooking and roasting machine operators and tenders, food and tobacco .....	31	28	.0	.0	-3	-8.5	6
Crushing, grinding, mixing, and blending machine operators and tenders .....	150	154	.1	.1	4	2.8	39
Cutting and slicing machine setters, operators and tenders .....	96	102	.1	.1	6	6.4	29

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Dairy processing equipment operators, including setters .....	15	12	0.0	0.0	-3	-20.4	4
Electronic semiconductor processors .....	63	92	.0	.1	29	45.2	38
Extruding and forming machine setters, operators, and tenders .....	126	132	.1	.1	6	5.0	36
Furnace, kiln, oven, drier, or kettle operators and tenders .....	25	24	.0	.0	-.1	-5.6	4
Laundry and dry-cleaning machine operators and tenders, except pressing .....	167	184	.1	.1	16	9.8	57
Motion picture projectionists .....	9	7	.0	.0	-2	-21.8	2
Packaging and filling machine operators and tenders .....	377	425	.3	.3	49	12.9	147
Painting and coating machine operators .....	171	186	.1	.1	15	8.8	52
Coating, painting, and spraying machine operators, tenders, setters, and set-up operators .....	129	140	.1	.1	11	8.7	39
Painters, transportation equipment .....	42	46	.0	.0	4	9.0	13
Paper goods machine setters and set-up operators .....	62	59	.0	.0	-3	-4.1	13
Photographic processing machine operators and tenders .....	46	41	.0	.0	-5	-11.4	18
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	28	26	.0	.0	-2	-7.2	7
Shoe sewing machine operators and tenders .....	7	4	.0	.0	-2	-35.8	1
Tire building machine operators .....	18	17	.0	.0	0	-1.4	3
All other machine operators, tenders, setters, and set-up operators .....	635	732	.5	.5	97	15.2	191
Hand workers, including assemblers and fabricators .....	3,092	3,382	2.2	2.1	290	9.4	967
Cannery workers .....	50	44	.0	.0	-6	-12.0	13
Coil winders, tapers, and finishers .....	22	22	.0	.0	1	2.5	4
Cutters and trimmers, hand .....	42	39	.0	.0	-4	-8.3	10
Electrical and electronic assemblers .....	246	265	.2	.2	19	7.7	63
Grinders and polishers, hand .....	81	84	.1	.1	3	4.3	25
Machine assemblers .....	67	71	.0	.0	4	5.5	16
Meat, poultry, and fish cutters and trimmers, hand .....	143	178	.1	.1	35	24.2	63
Painting, coating, and decorating workers, hand .....	39	46	.0	.0	7	17.7	16
Pressers, hand .....	13	12	.0	.0	-2	-11.4	4
Sewers, hand .....	10	8	.0	.0	-1	-14.8	2
Solderers and brazers .....	35	40	.0	.0	5	14.4	13
Welders and cutters .....	368	398	.3	.2	31	8.3	124
All other assemblers, fabricators, and hand workers .....	1,976	2,175	1.4	1.4	198	10.0	610
Transportation and material moving machine and vehicle operators .....	5,215	5,960	3.7	3.7	745	14.3	1,609
Motor vehicle operators .....	4,084	4,723	2.9	2.9	639	15.6	1,272
Bus drivers .....	638	747	.5	.5	108	17.0	223
Bus drivers, transit and intercity .....	203	235	.1	.1	32	15.8	69
Bus drivers, school .....	435	511	.3	.3	76	17.6	154
Taxi drivers and chauffeurs .....	132	158	.1	.1	26	20.0	48
Truck drivers .....	3,274	3,782	2.3	2.4	507	15.5	994
Driver/sales workers .....	305	319	.2	.2	14	4.7	75

**Table 2.** Continued—Employment by occupation, 1998 and projected 2008

[Numbers in thousands of jobs]

Occupation	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>
	Number		Percent distribution		Number	Percent	
	1998	2008	1998	2008			
Truck drivers light and heavy .....	2,970	3,463	2.1	2.2	493	16.6	919
All other motor vehicle operators .....	40	37	.0	.0	-3	-8.5	7
Rail transportation workers .....	85	75	.1	.0	-10	-11.4	31
Locomotive engineers .....	33	35	.0	.0	2	4.8	13
Railroad brake, signal, and switch operators .....	14	7	.0	.0	-7	-47.8	5
Railroad conductors and yardmasters .....	25	24	.0	.0	-2	-6.7	9
Subway and streetcar operators .....	3	4	.0	.0	0	7.1	1
All other rail transportation workers .....	8	5	.0	.0	-3	-35.6	3
Water transportation and related workers .....	56	58	.0	.0	3	4.7	24
Able seamen, ordinary seamen, and marine oilers .....	23	24	.0	.0	1	5.1	10
Captains and pilots, water vessels .....	19	19	.0	.0	1	3.0	8
Mates, ship, boat, and barge .....	8	9	.0	.0	1	7.9	4
Ship engineers .....	6	7	.0	.0	0	4.3	3
Material moving equipment operators .....	808	883	.6	.5	74	9.2	208
Crane and tower operators .....	49	49	.0	.0	0	.5	11
Excavation and loading machine operators .....	106	122	.1	.1	16	15.3	36
Hoist and winch operators .....	11	11	.0	.0	1	6.0	3
Industrial truck and tractor operators .....	415	454	.3	.3	38	9.2	87
All other material moving equipment operators .....	228	247	.2	.2	19	8.3	71
All other transportation and material moving equipment operators .....	183	222	.1	.1	39	21.5	75
Helpers, laborers, and material movers, hand .....	5,142	5,768	3.7	3.6	626	12.2	2,342
Cleaners of vehicles and equipment .....	288	360	.2	.2	72	25.0	163
Freight, stock, and material movers, hand .....	822	834	.6	.5	12	1.5	314
Hand packers and packagers .....	984	1,197	.7	.7	213	21.7	456
Helpers, construction trades .....	576	618	.4	.4	42	7.3	307
Machine feeders and offbearers .....	213	211	.2	.1	-2	-9	64
Parking lot attendants .....	86	113	.1	.1	27	31.2	42
Refuse and recyclable material collectors .....	99	103	.1	.1	4	3.9	42
Service station attendants .....	141	139	.1	.1	-2	-1.2	62
All other helpers, laborers, and material movers, hand .....	1,934	2,194	1.4	1.4	260	13.4	893

<sup>1</sup> Total job openings represent the sum of employment increases and net replacements. If employment change is negative, job openings due to growth are zero and total job openings equal net replacements.

NOTE: Detail may not equal total or 100 percent due to rounding.

Employment of physical therapy assistants and aides, occupational therapy assistants and aides, and occupational therapists is expected to grow much faster than average, partly due to the aging of the population, even though Federal Medicare reimbursement policies may restrict growth in the short term. The number of medical records and health information technicians employed also is expected to grow rapidly due to the need to maintain records for an increasing number

of medical tests, treatments, and procedures that will undergo increasing scrutiny by third-party payers, courts, and consumers.

Other health-related occupations in which employment is projected to grow rapidly include medical assistants, respiratory therapists, dental assistants, surgical technologists, dental hygienists, cardiovascular technologists and technicians, speech-language pathologists and audiologists, and ambu-

**Table 3.** Fastest growing occupations, 1998–2008

[Numbers in thousands of jobs]

Occupation	Employment		Change		Quartile rank by 1997 median hourly earnings <sup>1</sup>	Education and training category
	1998	2008	Number	Percent		
Computer engineers .....	299	622	323	108	1	Bachelor's degree
Computer support specialists .....	429	869	439	102	1	Associate degree
Systems analysts .....	617	1,194	577	94	1	Bachelor's degree
Database administrators .....	87	155	67	77	1	Bachelor's degree
Desktop publishing specialists .....	26	44	19	73	2	Long-term on-the-job training
Paralegals and legal assistants .....	136	220	84	62	2	Associate degree
Personal care and home health aides ..	746	1,179	433	58	4	Short-term on-the-job training
Medical assistants .....	252	398	146	58	3	Moderate-term on-the-job training
Social and human service assistants ..	268	410	141	53	3	Moderate-term on-the-job training
Physician assistants .....	66	98	32	48	1	Bachelor's degree
Data processing equipment repairers ..	79	117	37	47	2	Postsecondary vocational training
Residential counselors .....	190	278	88	46	3	Bachelor's degree
Electronic semiconductor processors ..	63	92	29	45	2	Moderate-term on-the-job training
Medical records and health information technicians .....	92	133	41	44	3	Associate degree
Physical therapy assistants and aides	82	118	36	44	3	Associate degree
Engineering, natural science, and computer and information systems managers .....	326	468	142	43	1	Work experience plus bachelor's or higher degree
Respiratory therapists .....	86	123	37	43	2	Associate degree
Dental assistants .....	229	325	97	42	3	Moderate-term on-the-job training
Surgical technologists .....	54	77	23	42	2	Postsecondary vocational training
Securities, commodities, and financial services sales agents .....	303	427	124	41	1	Bachelor's degree
Dental hygienists .....	143	201	58	41	1	Associate degree
Occupational therapy assistants and aides .....	19	26	7	40	2	Associate degree
Cardiovascular technologists and technicians .....	21	29	8	39	2	Associate degree
Correctional officers .....	383	532	148	39	2	Long-term on-the-job training
Speech-language pathologists and audiologists .....	105	145	40	38	1	Master's degree
Social workers .....	604	822	218	36	2	Bachelor's degree
Bill and account collectors .....	311	420	110	35	3	Short-term on-the-job training
Ambulance drivers and attendants, except EMTs .....	19	26	7	35	3	Short-term on-the-job training
Biological scientists .....	81	109	28	35	1	Doctoral degree
Occupational therapists .....	73	98	25	34	1	Bachelor's degree

<sup>1</sup> The quartile rankings of Occupational Employment Statistics hourly earnings data are presented in the following categories: 1=very high (\$16.25 and over), 2 = high (\$10.89 to \$16.14), 3 = low (\$7.78 to \$10.88), and 4 = very low

(up to \$7.76).

The rankings were based on quartiles using one-fourth of total employment to define each quartile.

lance drivers and attendants, except EMT's.

Faced with rapid growth in the demand for social and human services, employers are developing new strategies for delivering and funding services. Many employers will increasingly rely on social and human service assistants to undertake greater responsibility in delivering services to clients, resulting in rapid growth in this occupation. Paralegals and legal assistants are expected to continue to be in great demand in legal and related fields due to efforts to provide more cost-effective legal services to the public. This occupation also grew rapidly during the 1988–98 period. Engineering, natural science, and computer and information systems managers will grow rapidly, primarily due to the need to manage the rapidly-growing number of computer-related workers.

*Occupations with the largest job growth.* Many occupations with average or even below-average growth rates provide more job openings than some of the fastest growing occupations because of their large size. Most of the occupations with the largest projected job growth are concentrated in four industry sectors that are expected to account for more than three-fifths of the total growth in wage and salary jobs from 1998 to 2008: retail trade (which includes eating and drinking places); business services; health services; and public and private education. (See table 4.) Within retail trade, a large number of additional jobs are expected for retail salespersons; cashiers; waiters and waitresses; marketing and sales worker supervisors; and food, counter, fountain, and related workers.

The business services sector also is expected to contribute

**Table 4. Occupations with the largest job growth, 1998–2008**

[Numbers in thousands of jobs]

Occupation	Employment		Change		Quartile rank by 1997 median hourly earnings <sup>1</sup>	Education and training category
	1998	2008	Number	Percent		
Systems analysts .....	617	1,194	577	94	1	Bachelor's degree
Retail salespersons .....	4,056	4,620	563	14	4	Short-term on-the-job training
Cashiers .....	3,198	3,754	556	17	4	Short-term on-the-job training
General managers and top executives ..	3,362	3,913	551	16	1	Work experience plus bachelor's or higher degree
Truck drivers light and heavy .....	2,970	3,463	493	17	2	Short-term on-the-job training
Office clerks, general .....	3,021	3,484	463	15	3	Short-term on-the-job training
Registered nurses .....	2,079	2,530	451	22	1	Associate degree
Computer support specialists .....	429	869	439	102	1	Associate degree
Personal care and home health aides ...	746	1,179	433	58	4	Short-term on-the-job training
Teacher assistants .....	1,192	1,567	375	31	4	Short-term on-the-job training
Janitors and cleaners, including maids and housekeeping cleaners .....	3,184	3,549	365	11	4	Short-term on-the-job training
Nursing aides, orderlies, and attendants .....	1,367	1,692	325	24	4	Short-term on-the-job training
Computer engineers .....	299	622	323	108	1	Bachelor's degree
Teachers, secondary school .....	1,426	1,749	322	23	1	Bachelor's degree
Office and administrative support supervisors and managers .....	1,611	1,924	313	19	2	Work experience in a related occupation
Receptionists and information clerks ....	1,293	1,599	305	24	3	Short-term on-the-job training
Waiters and waitresses .....	2,019	2,322	303	15	4	Short-term on-the-job training
Guards .....	1,027	1,321	294	29	4	Short-term on-the-job training
Marketing and sales worker supervisors .....	2,584	2,847	263	10	2	Work experience in a related occupation
Food counter, fountain, and related workers .....	2,025	2,272	247	12	4	Short-term on-the-job training
Child care workers .....	905	1,141	236	26	4	Short-term on-the-job training
Laborers, landscaping and groundskeeping .....	1,130	1,364	234	21	3	Short-term on-the-job training
Social workers .....	604	822	218	36	2	Bachelor's degree
Hand packers and packagers .....	984	1,197	213	22	4	Short-term on-the-job training
Teachers, elementary school .....	1,754	1,959	205	12	1	Bachelor's degree
Blue-collar worker supervisors .....	2,198	2,394	196	9	1	Work experience in a related occupation
College and university faculty .....	865	1,061	195	23	1	Doctoral degree
Computer programmers .....	648	839	191	30	1	Bachelor's degree
Adjustment clerks .....	479	642	163	34	3	Short-term on-the-job training
Correctional officers .....	383	532	148	39	2	Long-term on-the-job training

<sup>1</sup> The quartile rankings of Occupational Employment Statistics hourly earnings data are presented in the following categories: 1=very high (\$16.25 and over), 2 = high (\$10.89 to \$16.14), 3 = low (\$7.78 to \$10.88), and 4 =

very low (up to \$7.76).

The rankings were based on quartiles using one-fourth of total employment to define each quartile.

significantly to the future job growth of several occupations. The computer and data processing services industry is expected to generate numerous opportunities for systems analysts; computer support specialists; and computer engineers. Computer programmers, although not projected to grow as rapidly as other computer occupations, will add a large number of jobs due to its large size.

The health services sector is expected to provide numerous opportunities for registered nurses; personal care and home health aides; and nursing aides, orderlies, and attendants. Registered nurses and personal care and home health aides also grew rapidly during the earlier period and the latter occupation was among the occupations with the largest job growth during that period.

The education industry is projected to provide large employment increases for teacher assistants, elementary and sec-

ondary school teachers, and college and university faculty. Most of the remaining occupations listed in table 4, such as general managers and top executives, janitors and cleaners, and truck drivers, are not expected to grow especially rapidly but will provide a large number of jobs due to their large size.

*Declining occupations.* This section of the article focuses on those occupations with the largest *numerical* job declines rather than on those with the fastest *rates* of decline because many detailed occupations in the latter category are very small and, consequently, the resulting employment declines are not very significant in terms of the total economy. (See table 5.) There are two major reasons occupations fall into this category: either the industry they are concentrated in is projected to decline or technological or business practices will reduce the demand for the occupation in most industries.

**Table 5.** Occupations with the largest job decline, 1998–2008

[Numbers in thousands of jobs]

Occupation	Employment		Change	
	1998	2008	Number	Percent
Farmers .....	1,308	1,135	-173	-13
Sewing machine operators, garment .....	369	257	-112	-30
Child care workers, private household .....	306	209	-97	-32
Word processors and typists .....	459	365	-93	-20
Bookkeeping, accounting, and auditing clerks ....	2,078	1,997	-81	-4
Cleaners and servants, private household .....	600	530	-71	-12
Farm workers .....	851	794	-57	-7
Computer operators, except peripheral equipment .....	224	170	-54	-24
Textile draw-out and winding machine operators and tenders .....	192	141	-50	-26
Bank tellers .....	560	529	-31	-5
Switchboard operators .....	214	185	-30	-14
Inspectors, testers, and graders, precision .....	689	667	-22	-3
Machine tool cutting operators and tenders, metal and plastic .....	109	88	-22	-20
Butchers and meatcutters .....	216	201	-15	-7
Payroll and timekeeping clerks .....	172	161	-11	-6
Peripheral equipment operators .....	27	17	-10	-38
Woodworking machine operators and tenders, setters and set-up operators .....	79	69	-10	-13
Offset lithographic press operators .....	63	54	-9	-15
Fishers .....	40	31	-9	-23
Procurement clerks .....	58	49	-9	-15
Station installers and repairers, telephone .....	24	16	-8	-34
Welfare eligibility workers and interviewers .....	109	100	-8	-8
Typesetting and composing machine operators and tenders .....	13	5	-8	-60
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	42	34	-8	-18
Film strippers, printing .....	23	15	-8	-33
Directory assistance operators .....	23	16	-7	-31
Housekeepers and butlers .....	17	10	-7	-42
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic ..	75	68	-7	-10
Proofreaders and copy markers .....	41	34	-7	-17
Railroad brake, signal, and switch operators .....	14	7	-7	-48

Industry employment change is the major cause of projected employment declines for sewing machine operators, garment and for butchers and meatcutters. However, most of the occupations with the largest decline are affected by technological change, in particular the use of computer technology, which will significantly reduce demand for word processors and typists; bookkeeping, accounting, and auditing clerks; and bank tellers. Even computer operators, except peripheral equipment, are on this list due to the shift away from large mainframe computers that these workers operate. The decline in employment in word processors and typists and bookkeeping, accounting, and auditing clerks, however, was much larger in the 1988–98 period. Printing and publishing occupations will be greatly affected by the continued shift to computerized printing and publishing methods, making for decreases in the employment of offset lithographic press operators; typesetting and composing machine operators and tenders; film strippers, printing; and proofreaders and copy

markers. Rapid changes in telecommunications, including both automated technology and changes in business practices, will result in employment declines for switchboard operators; station installers and repairers, telephone; and directory assistance operators.

Some occupations will be affected both by changes in technology or business practices and declines in the industries in which they are employed. Such occupations include farmers; farm workers; welfare eligibility workers and interviewers; and railroad brake, signal, and switch operators.

### Total job openings

In addition to occupational employment growth, another aspect of the demand for workers is the need to replace workers who leave their jobs to enter other occupations, retire, or leave the labor force for other reasons. Job openings resulting from replacement needs are very important because, in most occu-

**Table 6.** Employment and total job openings, 1998–2008, and 1997 median hourly earnings by education and training category

[Numbers in thousands of jobs]

Education and training category	Employment				Change		Total job openings due to growth and net replacements, 1998–2008 <sup>1</sup>		Median hourly earnings, percent distribution, 1997 <sup>2</sup>			
	Number		Percent distribution		Number	Percent	Number	Percent distribution	Quartile			
	1998	2008	1998	2008					1	2	3	4
Total, all occupations ...	140,514	160,795	100.0	100.0	20,281	14.4	54,622	100.0	25.0	25.0	25.0	25.0
First professional degree ...	1,908	2,215	1.4	1.4	308	16.1	617	1.1	92.2	7.8	...	...
Doctoral degree .....	996	1,228	.7	.8	232	23.3	502	.9	100.0	...	...	...
Master's degree .....	940	1,115	.7	.7	174	18.6	372	.7	97.5	2.5	...	...
Work experience plus bachelor's or higher degree .....	9,595	11,276	6.8	7.0	1,680	17.5	3,372	6.2	94.1	3.2	2.7	...
Bachelor's degree .....	17,379	21,596	12.4	13.4	4,217	24.3	7,727	14.1	76.2	19.1	3.3	1.4
Associate degree .....	4,930	6,467	3.5	4.0	1,537	31.2	2,414	4.4	70.5	25.3	4.2	...
Postsecondary vocational training .....	4,508	5,151	3.2	3.2	643	14.3	1,667	3.1	7.2	60.5	17.2	15.1
Work experience in a related occupation .....	11,174	12,490	8.0	7.8	1,316	11.8	3,676	6.7	26.1	50.7	23.1	0.1
Long-term on-the-job training .....	13,436	14,604	9.6	9.1	1,168	8.7	4,397	8.0	15.9	57.7	7.3	19.1
Moderate-term on-the-job training .....	20,521	21,952	14.6	13.7	1,430	7.0	6,213	11.4	0.8	55.9	39.8	3.6
Short-term on-the-job training .....	55,125	62,701	39.2	39.0	7,576	13.7	23,665	43.4	0.7	7.8	35.8	55.8

<sup>1</sup> Total job openings represent the sum of employment increases and net replacements. If employment change is negative, job openings due to growth are zero and total job openings equal net replacements.

<sup>2</sup> The quartile rankings of Occupational Employment Statistics hourly earnings data are presented in the following categories: 1 = very high (\$16.25 and

over), 2 = high (\$10.89 to \$16.14), 3 = low (\$7.78 to \$10.88), and 4=very low (up to \$7.76).

The rankings were based on quartiles using one-fourth of total employment to define each quartile.

NOTE: Detail may not equal total or 100 percent due to rounding.

pations, they exceed those resulting from employment growth. Even occupations that are projected to decline provide some job openings. (See table 2.)

The measure of replacement needs is complex because of the continuous movement of workers into and out of occupations. The replacement needs cited in this article are based on the net change in employment (entrants minus separations) in each age cohort over the projection period. This measure understates the total number of job openings in an occupation but best represents the job openings for new labor force entrants over the projection period.<sup>3</sup>

Over the 1998–2008 period, more job openings are expected to result from replacement needs (34.7 million) than from employment growth in the economy (20.3 million). The number of job openings attributable to net replacement needs is expected to exceed the number of openings due to growth for the major occupational groups that are projected to grow more slowly than average—administrative support occupations, including clerical; agricultural, forestry, fishing, and related occupations; precision production, craft, and repair occupations; and operators, fabricators and laborers. This pattern differs for the professional specialty occupations group, which has the fastest rate of growth among the major groups, and for many detailed occupations that

are projected to grow more rapidly than average.

The number of job openings for service occupations is expected to be 11.1 million in the 1998–2008 period, exceeding the number for professional occupations, the next largest group, by nearly 1.9 million. Accounting for 1 out of every 5 total job openings, numerous opportunities for service workers are expected to result from both net replacements and employment growth. A large number of replacements are expected to result from the movement of young workers in food preparation and service occupations to other occupations.

### Education, training requirements, earnings

Occupations requiring an associate degree or more education, which accounted for one-fourth of all jobs in 1998, will account for 40 percent of total job growth from 1998 to 2008. Occupations requiring no education and training beyond high school, except for on-the-job training, will account for 57 percent of the job growth between 1998 and 2008.

The largest education and training category is short-term on-the-job training, in which workers generally learn job skills in a few weeks or less. In 1998, the 55 million workers in those occupations accounted for 39 percent of total employment.

## Exhibit 1. Occupational education and training requirements categories

Occupations are classified into one of 11 categories that describe the education and training needed by most workers to become fully qualified. The following principles were used to develop this classification system:

1. An occupation is placed into the category that reflects the manner in which most workers become proficient in that occupation.
2. Postsecondary institutional education requirements leading to degrees and certificates are used to classify occupations in which completion of that program is the most common way of entering the occupation, even though additional on-the-job experience is usually needed to become proficient in the occupation.
3. The length of time it generally takes an average worker to achieve proficiency through a combination of on-the-job training and experience is used to classify occupations in which postsecondary training is generally not needed for entry.

**First professional degree.** *Occupations that require a professional degree.* Completion of the academic program usually requires at least 6 years of full-time equivalent academic study, including college study prior to entering the professional degree program.

**Doctoral degree.** *Occupations that generally require a Ph.D. or other doctoral degree.* Completion of the degree program usually requires at least 3 years of full-time equivalent academic work beyond the bachelor's degree.

**Master's degree.** *Occupations that generally require a master's degree.* Completion of the degree program usually requires 1 or 2 years of full-time equivalent study beyond the bachelor's degree.

**Work experience, plus a bachelor's or higher degree.** *Occupations that generally require work experience in an occupation requiring a bachelor's degree or higher.* Most occupations in this category are managerial occupations that require experience in a related nonmanagerial position.

**Bachelor's degree.** *Occupations that generally require a bachelor's degree.* Completion of the degree program generally requires at least 4 years, but not more than 5 years, of full-time equivalent academic work.

**Associate degree.** *Occupations that generally require an associate degree.* Completion of the degree program usually requires at least 2 years of full-time equivalent academic work.

**Postsecondary vocational training.** *Occupations that generally require completion of vocational school training.* Some programs last only a few weeks while others may last more than a year. In some occupations, a license is needed that requires passing an examination after completion of the training.

**Work experience in a related occupation.** *Occupations that generally require skills obtained through work experience in a related occupation.* Some occupations requiring work experience are supervisory or managerial occupations.

**Long-term on-the-job training.** *Occupations that generally require more than 12 months of on-the-job training or combined work experience and formal classroom instruction for workers to develop the skills necessary for average job performance.* This category includes formal and informal apprenticeships that may last up to 4 years and short-term intensive employer-sponsored training that workers must successfully complete. Individuals undergoing training are generally considered to be employed in the occupation. This category includes occupations in which workers may gain experience in nonwork activities, such as professional athletes who gain experience through participation in athletic programs in academic institutions.

**Moderate-term on-the-job training.** *Occupations in which workers can develop the skills needed for average job performance after 1 to 12 months of combined on-the-job experience and informal training.*

**Short-term on-the-job training.** *Occupations in which workers generally can develop the skills needed for average job performance after a short demonstration or up to 1 month of on-the-job experience or instruction.*

(See table 6.) Most occupations in this category are administrative support occupations, including clerical; operators, fabricators, and laborers; and service occupations. More than 9 out of 10 of these workers earned less than the median for all wage and salary workers in 1997 and the earnings of more than half fell in the lowest earnings quartile. Although only three of these occupations—personal care and home health care aides, bill and account collectors, and ambulance drivers and attendants, except EMT's—appear on the list of the 30 fastest growing occupations, more than half of those with the largest job growth fall into this category. The projected increase in employment for all detailed occupations requiring short-term training is 7.6 million jobs.

Occupations requiring moderate-term on-the-job training, in which workers can generally learn their skills after 1 to 12 months of combined on-the-job experience and informal training, accounted for 20.5 million workers, or 14.6 percent of total employment in 1998, and are projected to grow by 1.4 million jobs. These workers earned significantly more than workers in the lowest training category—more than half earned more than the median for all wage and salary workers in 1997.

Occupations in which workers generally require more than a year of on-the-job experience and formal training—such as carpenters; police patrol officers; and maintenance repairers, general utility—accounted for 9.6 percent of total employment in 1998. An additional 8 percent were employed in occupations requiring experience in another occupation that generally did not require post-secondary education or training. Many of these workers are supervisors or managers. Occupations requiring postsecondary vocational training accounted for 3.2 percent of total employment in 1998. This category is projected to increase by 643,000 jobs by 2008.

Occupations requiring training leading to an associate degree accounted for 3.5 percent of all jobs in the base year and are expected to increase by 1.5 million jobs by 2008. It is important to note, however, that more than two-fifths of the employees in this group are registered nurses. While most nurses currently get their training in associate's degree programs, a considerable number have obtained bachelors' degrees, which indicates that there is some overlapping of educational requirements among the groups.

Occupations requiring a bachelor's degree accounted for 12.4

percent of all workers in 1998. Employment in this category is projected to grow by more than 4.2 million jobs by 2008. In addition, jobs in which workers needed experience in another occupation requiring at least a bachelor's degree before getting their current job accounted for another 6.8 percent of all workers in 1998. The overwhelming majority of employees in this category worked in managerial and administrative occupations. Many of the fastest growing occupations and those with the largest projected numerical increases require bachelors' degrees and almost all workers in these occupations earned more than the median for all wage and salary workers. More than three-quarters of those in occupations requiring at least a bachelor's degree had earnings that placed them in the highest earnings quartile in 1997, and 19 out of 20 of those in occupations requiring work experience plus a bachelor's or higher degree had earnings in the highest earnings quartile.

A relatively small proportion of workers are employed in occupations that require more education than a bachelor's degree, including those requiring a first professional degree (1.4 percent), doctoral degree (0.7 percent), and master's degree (0.7 percent). Together, these three categories are projected to grow by 714,000 between 1998 and 2008.

All of the categories requiring at least an associate degree are projected to have faster-than-average employment growth over the 1998–2008 period; all the categories requiring less education and training are expected to grow more slowly than average.

The share of total job openings resulting from both employment growth and net replacement needs in each of the education and training categories differs from the distribution of employment in the base year. For example, all the categories requiring at least an associate degree will generate nearly 600,000 more new jobs than those occupations requiring short-term, on-the-job training through 2008. However, when replacement needs are considered also, occupations in the latter category will have far more openings—nearly 9 million more than the group of workers with at least an associate degree. In general, workers in occupations requiring the least amount of education and training have less job attachment than do employees in other occupations. Therefore, occupations in the lowest training categories have a greater share of total job openings than their share of openings created by employment growth alone. □

## Notes

<sup>1</sup> Occupational projections presented in this article provide information to those interested in labor market issues. They also provide the background for analyses of future employment opportunities described in the forthcoming 2000–01 *Occupational Outlook Handbook*, BLS Bulletin 2520. Job outlook information in the 2000–01 *Handbook*, scheduled for release in early 2000, will use the projections presented in each of the articles that make up *Employment Outlook: 1998–2008*. For a description of the methodology used to develop employment projections, see *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, April 1997), pp. 122–29.

<sup>2</sup> In this article, the services industry includes State and local govern-

ment hospitals and public education. In the article on industry employment by Allison Thomson (this issue, pages 33–50), workers in State and local government hospitals and public education are included in the estimates of government employment.

<sup>3</sup> Net separations do not count all movements of workers out of an occupation, which is a measure termed total separations. For example, an opening caused by a worker who stops working for a period then gets another job in his or her previous occupation would be counted in the measure of total separations but not net separations. See the discussion on the uses of replacement needs information developed in *Occupational Projections and Training Data*, Bulletin 2521 (Bureau of Labor Statistics, forthcoming).