

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.¹

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,

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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,² 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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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 ¹
	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

¹ 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 ¹	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

¹ 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 ¹	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

¹ 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 ¹		Median hourly earnings, percent distribution, 1997 ²			
	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

¹ 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.

² 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.³

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

¹ 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.

² 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.

³ 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).