

Lynda R. Wiest  
College of Education  
University of Nevada, Reno  
October 2002

## **Choosing a Career: A Look at Employment Statistics**

**Suggested Grade Levels:** 7 and up

**Possible Subject Area(s):** Occupational Education; Social Studies

**Math Skills:** reading, interpreting, and graphing data (including exploration of patterns and relationships); expressing and calculating percents; contrasting mean and median (optional); exploring the concept of quartiles (optional)

**Overview:** Students will explore a variety of employment statistics, in particular, those related to fastest-growing, highest-paying, and nontraditional occupations. They will also examine some statistics by workers' age, educational attainment, and sex.

---

### ***Student Activities: Choosing a Career: A Look at Employment Statistics***

***I. Use the employment statistics in the table that follows to answer the questions in this section.***

1. Examine general patterns and relationships by answering the following questions.
  - A. What general occupational categories seem to appear most frequently?
  - B. Does pay for these occupations seem to be upper-, middle-, or lower-range? (It may help to look at the information in the Section II #4 table.)
  - C. Does a relationship seem to exist between education and pay levels?
  - D. Are there any other observations you can make?
  
2. Answer the following questions related to percent increase from 2000 to 2010.
  - A. In 2000, how many people were employed in the occupation computer software engineers, applications?
  - B. How many are projected to work in that occupation in 2010?
  - C. What is this increase as a number?
  - D. What is this increase as a percent?
  - E. What is the anticipated percent increase for pharmacy technicians from 2000 to 2010?

<b>30 Fastest-Growing U.S. Occupations, 2000-2010</b> (Employment Numbers in Thousands of Jobs)				
<b>Occupation</b>	<b>Employment</b>		<b>Mean Annual Wages</b>	<b>Education Required</b>
	<b>2000</b>	<b>2010</b>		
Computer software engineers, applications	380	760	\$70,300	Bachelor's degree
Computer support specialists	506	996	\$39,680	Associate degree
Computer software engineers, systems software	317	601	\$70,890	Bachelor's degree
Network and computer systems administrators	229	416	\$53,690	Bachelor's degree
Network systems and data communications analysts	119	211	\$57,890	Bachelor's degree
Desktop publishers	38	63	\$32,700	Postsecondary vocational award
Database administrators	106	176	\$55,810	Bachelor's degree
Personal and home care aides	414	672	\$15,960	Short-term on-the-job training
Computer systems analysts	431	689	\$61,210	Bachelor's degree
Medical assistants	329	516	\$23,840	Moderate-term on-the-job training
Social and human service assistants	271	418	\$23,840	Moderate-term on-the-job training
Physician assistants	58	89	\$60,680	Bachelor's degree
Medical records and health information technicians	136	202	\$24,430	Associate degree
Computer and information systems managers	313	463	\$80,250	Bachelor's or higher degree, plus work experience
Home health aides	615	907	\$18,110	Short-term on-the-job training
Physical therapist aides	36	53	\$20,930	Short-term on-the-job training
Occupational therapist aides	9	12	\$23,330	Short-term on-the-job training
Physical therapist assistants	44	64	\$34,370	Associate degree
Audiologists	13	19	\$47,670	Master's degree
Fitness trainers and aerobics instructors	158	222	\$28,750	Postsecondary vocational award
Computer and information scientists, research	28	39	\$73,430	Doctoral degree
Veterinary assistants and laboratory animal caretakers	55	77	\$17,790	Short-term on-the-job training
Occupational therapist assistants	17	23	\$34,860	Associate degree
Veterinary technologists and technicians	49	69	\$22,730	Associate degree
Speech-language pathologists	88	122	\$48,480	Master's degree
Mental health and substance abuse social workers	83	116	\$32,240	Master's degree
Dental assistants	247	339	\$26,740	Moderate-term on-the-job training
Dental hygienists	147	201	\$51,980	Associate degree
Teachers, special education, elementary, kindergarten, preschool (pre-K)	234	320	\$42,000/ pre-K \$20,000	Bachelor's degree
Pharmacy technicians	190	259	\$21,600	Moderate-term on-the-job training

Source: U.S. Department of Labor, Bureau of Labor Statistics (<http://www.bls.gov>)

Notes: Fastest-growing occupation is listed first; other occupations follow in descending order. Figure for teachers is estimate based on range of about \$40,000-\$44,000 for different types of teachers listed (kindergarten teachers on lower, elementary in middle, and special education on upper end of range).

3. Suppose you were a guidance counselor at your school. Tell what occupations you might suggest to the following students, who want fast-growing occupations to have a better chance of getting a job:
  - A. Bryan wants a health-related career that does not require earning a degree or award.
  - B. Jennifer wants a high-paying, technology-related career that does not require higher than a bachelor's degree.
  - C. Kari is mainly interested in a career that involves working with people, and she would like to earn at least a master's degree.

**II. In this section, you will explore employment statistics for various categories of workers.**

1. Base your answers to the following questions on the table below, which shows workers' weekly earnings by age, educational attainment, and sex.
  - A. Make a line graph of weekly earnings (total for both sexes) across the seven age categories. Explain what the graph shows. (Instead of a single line graph, you may choose to create a double line graph of women's and men's earnings or a triple line graph that includes data for both sexes combined, women, and men.)
  - B. Express women's earnings as a percent of men's for ages 16 and over and for ages 25 and over. Does the gap widen or narrow after age 25?
  - C. Express women's earnings as a percent of men's for each of the seven age categories beginning with 16 to 19 years. Make a line graph of this data and describe what it shows.
  - D. Is there a relationship between education and earning levels? Explain.

<b>2000 Median Weekly Earnings by Age, Educational Attainment, and Sex (Full-Time Workers)</b>			
<b>Characteristic</b>	<b>Weekly Earnings, Both Sexes (\$)</b>	<b>Weekly Earnings, Women (\$)</b>	<b>Weekly Earnings, Men (\$)</b>
<b>AGE</b>			
Total, 16 years and over	576	491	646
Total, 25 years and over	611	515	700
16 to 19 years	294	279	304
20 to 24 years	383	364	396
25 to 34 years	550	493	603
35 to 44 years	631	520	731
45 to 54 years	671	565	777
55 to 64 years	617	505	738
65 years and over	442	378	537
<b>EDUCATION (age 25 and over)</b>			
Less than a high school diploma	360	303	409
High school graduate, no college	506	421	594
Some college or associate degree	598	504	699
College graduates, total	896	760	1022

Source: *Highlights of Women's Earnings in 2000*, U.S. Department of Labor, Bureau of Labor Statistics, 2001

2. Female management analysts earn \$819 weekly and male management analysts earn \$1,340. Female computer systems analysts and scientists earn \$922 weekly and males in the same

position earn \$1,065. What percent of men's salaries do women earn in each of these occupations?

3. Answer the following questions using the table of women's top ten occupations below.
  - A. What types of occupations do women tend to have?
  - B. What percent do women make up of all employed workers?
  - C. What percent of sales supervisors and proprietors are women?
  - D. Which occupation has the highest percent women? Name the percent.
  - E. Compare women's leading occupations to the fastest-growing occupations shown in the Section I table. Do women's occupations tend to be among the fastest-growing?

<b>Top 10 Occupations of Employed Women (2001 Annual Average in Thousands)</b>		
<b>Occupations</b>	<b>Total Employed Workers</b>	<b>Total Employed Women</b>
All occupations, 16 years and over	135,073	62,992
Managers and administrators	8,018	2,486
Secretaries	2,404	2,366
Cashiers	2,974	2,288
Registered nurses	2,162	2,013
Sales supervisors and proprietors	4,836	1,990
Nursing aides, orderlies, and attendants	2,081	1,874
Elementary school teachers	2,216	1,828
Bookkeepers, accounting, and auditing clerks	1,621	1,506
Waiters and waitresses	1,347	1,029
Sales workers, retail and personal services	2,311	1,023

Source: U.S. Department of Labor, Women's Bureau (<http://www.dol.gov/dol/wb/>)

4. The table that follows shows the highest-paying job categories (of the 22 Standard Occupational Classification categories). Do women's main occupations seem to be among them? [The other categories not shown include: Installation, Maintenance, and Repair (\$33,760); Community and Social Services (\$32,910); Protective Service (\$30,780); Sales and Related (\$27,990); Production (\$26,450); Office and Administrative Support (\$26,300); Transportation and Material Moving (\$25,630); Healthcare Support (\$21,040); Personal Care and Service (\$20,510); Building and Grounds Cleaning and Maintenance (\$19,570); Farming, Fishing, and Forestry (\$18,860); Food Preparation and Serving (\$16,070).]

<b>Highest-Paying Job Categories (2000)</b>	
<b>Occupational Group</b>	<b>Mean Annual Wage</b>
Legal	\$68,930
Management	\$68,190
Computer and Mathematical	\$58,050
Architecture and Engineering	\$54,060
Business and Financial Operations	\$48,470
Healthcare Practitioners and Technical	\$47,990
Life, Physical, and Social Science	\$47,790
Art, Design, Entertainment, Sports, and Media	\$38,640
Education, Training, and Library	\$37,900
Construction and Extraction	\$34,440

Source: U.S. Department of Labor, Bureau of Labor Statistics (<http://www.bls.gov>)

1. If either women or men make up 25% or less of all workers in an occupation, that occupation is considered to be “nontraditional” for that sex. Use the table below for the following questions.
  - A. Tell which occupations are nontraditional for women and which are nontraditional for men. Explain how you found your answers.
  - B. How can you make reasonable estimates for identifying nontraditional occupations before confirming them with a calculator?

<b>Number of Workers in Selected Occupations (2000)</b> (to the nearest thousand)		
<b>Occupations</b>	<b>Women</b>	<b>Men</b>
Airplane pilots and navigators	3,000	95,000
Bakers	45,000	79,000
Bank tellers	275,000	27,000
Bus drivers	148,000	180,000
Civil engineers	29,000	229,000
Computer programmers	163,000	465,000
Dental assistants	132,000	5,000
Dietitians	69,000	10,000
Farm workers	81,000	508,000
Hotel clerks	73,000	25,000
Lawyers	165,000	400,000
Real estate sales	204,000	154,000
Social workers	523,000	211,000
Teachers, secondary school	653,000	501,000
Waiters and waitresses	411,000	184,000

Source: *Highlights of Women's Earnings in 2000*, U.S. Department of Labor, Bureau of Labor Statistics, 2001

**III. Answer the following miscellaneous questions about employment statistics.**

1. The percent increase in annual earnings is greater for some occupations than for others. What relationship does faster pay growth bear to level of annual wage earnings for an occupation?
  2. To answer the following question, go to <http://www.movingvan.com/tools/CareerTool.cfm>. How much more money does a police patrol officer earn in West Palm Beach, Florida, than in Akron, Ohio? Does this information mean that a police patrol officer who had a job offer in both places and liked both equally well should choose the West Palm Beach job?
- 

**Information for the Teacher**

Answers to some of these problems may differ slightly from ones found elsewhere, because they are calculated from rounded rather than actual figures.

Teachers might want to discuss what type of work people do in certain types of occupations, and they also might want to explain the difference between “wage” and “salary.” The school guidance counselor would be a good resource for assisting with these discussions or background information for these discussions.

These activities lend themselves nicely to a discussion of mean and median since the former is mentioned in regard to annual wages and the latter as a measure of weekly earnings. The class might discuss how these two types of averages differ and the differential impressions they may create for a data set. The concept of quartiles might also be explored—the answer to Section I #1B below provides one such possibility.

The top 20 women’s occupations may be found at [http://www.dol.gov/dol/wb/public/wb\\_pubs/20lead2001.htm](http://www.dol.gov/dol/wb/public/wb_pubs/20lead2001.htm).

The class may want to brainstorm and research reasons for women’s lower earnings in relation to men. Interruptions to their careers for child rearing are one such cause.

These activities might be extended to include workers’ earnings by race and marital status. By race, for example, Whites earn the highest weekly wages, and by marital status, married individuals with a spouse present earn the highest weekly wages. This type of data, as well as pay data by individual state, is available in *Highlights of Women’s Earnings in 2000*, found on the Bureau of Labor Statistics’ web site.

If either women or men make up 25% or less of all workers in an occupation, that occupation is considered to be “nontraditional” for that sex. A list of nontraditional occupations for women in 2001 may be found at [http://www.dol.gov/dol/wb/public/wb\\_pubs/nontrad2001.htm](http://www.dol.gov/dol/wb/public/wb_pubs/nontrad2001.htm).

Besides the task that appears in Section III #2, students might be asked to do additional, perhaps personalized, explorations at movingvan.com’s web site’s “Career & Salary by Location” (<http://www.movingvan.com/tools/CareerTool.cfm>). Here, students may find salaries for a limited number of careers in selected cities, as well as the national average salary for each career

to use as a point of comparison. Averages (means) used for this site are from the Bureau of Labor Statistics.

## **Answers to Problems and Questions**

### ***I. Fastest-Growing Occupations***

1. A. Computer-related and health-related occupations.
  - B. Although there is a mix, these occupations seem slightly more weighted toward lower-paying professions. Twelve of the 30, for example, have an average annual wage less than \$30,000 (excluding preschool teachers), and most of these are less than \$25,000. On a related note, all workers are not, of course, distributed evenly across occupations. Quartile rankings of Occupational Employment Statistics, for example, place the top fourth of workers (pay-wise) at an annual earnings of about \$40,000 and over and the lowest fourth at about \$18,500 and under. These earnings rankings only reflect proportional distribution of workers rather than which occupations—regardless of the number of workers in them—may be considered high- or low-paying.
  - C. In general, yes. Some noted exceptions include dental hygienists, computer and information systems managers, and the three occupations requiring master's degrees. (Rearrangement of the table as follows—ordered by education level—allows better exploration of pay-education relationships.) It is important to note, however, that these selected occupations cannot be considered representative of all occupations, and that the data are too limited in number to make reliable claims (acutely so for the four occupations requiring higher than a bachelor's degree). The table in Section II #1D shows earnings by educational attainment. Because these data are comprehensive (they include all occupations), they may be considered to be conclusive in a generalized sense.
  - D. Students may make comments on other data or relationships in the table. (Answers will vary.)
2. A. 380,000 people. (Numbers represent thousands.)
  - B. 760,000 people.
  - C. 380,000
  - D. 100%
  - E. 36%
3. Refer to the rearranged table below to see the answers to these questions more easily. Students may say for any of these that they would explore the person's interests more fully to help make a match from among several options they name.
  - A. Most of the occupations requiring no more than on-the-job training are health-related. Students might say they would suggest the highest-paying of these, dental assistant.
  - B. The best match is a computer and information systems manager.
  - C. The two top-paying occupations that match Kari's interests are speech-language pathologist and audiologist.

<b>30 Fastest-Growing U.S. Occupations, 2000-2010</b> (Employment Numbers in Thousands of Jobs)				
<b>Occupation</b>	<b>Employment</b>		<b>Mean Annual Wages</b>	<b>Education Required</b>
	<b>2000</b>	<b>2010</b>		
Computer and information scientists, research	28	39	\$73,430	Doctoral degree
Speech-language pathologists	88	122	\$48,480	Master's degree
Audiologists	13	19	\$47,670	Master's degree
Mental health and substance abuse social workers	83	116	\$32,240	Master's degree
Computer and information systems managers	313	463	\$80,250	Bachelor's or higher degree, plus work experience
Computer software engineers, systems software	317	601	\$70,890	Bachelor's degree
Computer software engineers, applications	380	760	\$70,300	Bachelor's degree
Computer systems analysts	431	689	\$61,210	Bachelor's degree
Physician assistants	58	89	\$60,680	Bachelor's degree
Network systems and data communications analysts	119	211	\$57,890	Bachelor's degree
Database administrators	106	176	\$55,810	Bachelor's degree
Network and computer systems administrators	229	416	\$53,690	Bachelor's degree
Teachers, special education, elementary, kindergarten, preschool (pre-K)	234	320	\$42,000/pre-K \$20,000	Bachelor's degree
Dental hygienists	147	201	\$51,980	Associate degree
Computer support specialists	506	996	\$39,680	Associate degree
Occupational therapist assistants	17	23	\$34,860	Associate degree
Physical therapist assistants	44	64	\$34,370	Associate degree
Medical records and health information technicians	136	202	\$24,430	Associate degree
Veterinary technologists and technicians	49	69	\$22,730	Associate degree
Desktop publishers	38	63	\$32,700	Postsecondary vocational award
Fitness trainers and aerobics instructors	158	222	\$28,750	Postsecondary vocational award
Dental assistants	247	339	\$26,740	Moderate-term on-the-job training
Medical assistants	329	516	\$23,840	Moderate-term on-the-job training
Social and human service assistants	271	418	\$23,840	Moderate-term on-the-job training
Pharmacy technicians	190	259	\$21,600	Moderate-term on-the-job training
Occupational therapist aides	9	12	\$23,330	Short-term on-the-job training
Physical therapist aides	36	53	\$20,930	Short-term on-the-job training
Home health aides	615	907	\$18,110	Short-term on-the-job training
Veterinary assistants and laboratory animal caretakers	55	77	\$17,790	Short-term on-the-job training
Personal and home care aides	414	672	\$15,960	Short-term on-the-job training

Source: U.S. Department of Labor, Bureau of Labor Statistics (<http://www.bls.gov>)

Notes. Occupations are listed from highest to lowest required education level; within each education level, occupations are ordered from highest to lowest mean annual wage. (Data is *not* arranged by occupation's rate of growth.) Figure for teachers is estimate based on range of about \$40,000-\$44,000 for different types of teachers listed (kindergarten teachers on lower, elementary in middle, and special education on upper end of range).

## II. *Employment Statistics by Worker Category*

1.
  - A. The line graph will show that workers' pay increases across the first five age categories but then declines across the final two. The optional triple line graph would show the same plus a line for men's earnings above and a line for women's earnings below. (The optional double line graph would omit the line for the combined earnings.)
  - B. 76% for ages 16 and over and 74% for ages 25 and over. The gap widens. (#1C explores this fact more specifically.)
  - C. Students' line graph will reflect the following figures: 92% (16-19), 92% (20-24), 82% (25-34), 71% (35-44), 73% (45-54), 68% (55-64), 70% (65 and over). The male-female wage differential is stable across the first two age categories, widens across the next two, and then remains somewhat stable across the final four age groupings. In other words, the "best" scenario for pay equity is in women workers' younger years and the worst is at middle and older ages.
  - D. Yes, pay tends to increase with advanced education. Because the table displays average data across many occupations, selected individual occupations will not fit this pattern, as shown in earlier explorations. (Note, for example, pay and education levels for the three occupations requiring master's degrees, the computer and information systems managers, and dental hygienists.)
2. 61% for management analysts and 87% for computer systems analysts and scientists.
3.
  - A. Non-technological jobs; jobs working with people; lower-skill jobs (those requiring less education). Students may also make pay-related comments (see #4 below).
  - B. About 47% (46.6%).
  - C. 41%.
  - D. Secretaries—more than 98% (98.4%).
  - E. No. (The occupation of elementary teacher is an exception.)
4. No. Only management, registered nurses, and elementary teachers appear on the list, which fall into the second, sixth, and ninth highest-paying occupational groups, respectively. Note that registered nurses fall under the healthcare practitioners category, and nursing aides, orderlies, and attendants are classified under healthcare support. The two "sales" occupations fall under the occupational category "sales and related." (Also, as demonstrated in the previous section, women's pay falls on the lower side within occupational groups, particularly the highest-paying of the three noted here—management.)
5.
  - A. Women: airplane pilots and navigators (3%), civil engineers (11%), farm workers (14%). Men: bank tellers (9%), dental assistants (4%), dietitians (13%). Find the total number of workers for an occupation by adding the number of female and male workers, and then divide the number of female or male workers (the smaller number) by the total number of workers to see if the proportion is 25.0% or less. (Because all figures are rounded to the nearest thousand, students might ignore the final three zeros in figures in doing their computations.)
  - B. The number of women or men in an occupation would have to be one-third or less of the number of workers of the other sex in order to comprise 25% or less of all workers. This

is so because the reference is the number of workers of the other sex rather than the total number of workers (i.e., a comparison of one-fourth to three-fourths).

**III. Answer the following miscellaneous questions about employment statistics.**

1. None, in a general sense. For example, an occupation with a 10% annual earnings increase from one year to the next might only have increased from \$20,000 to \$22,000, whereby it would remain among the lower-paying occupations. An occupation with a consistently higher-than-average percent increase in annual earnings might move upward on the pay scale in relation to other occupations over time, but it will not necessarily be among the highest-paying occupations (although it may eventually be if its high rate of increase is sustained long enough).
2. \$7,440 (\$40,500-\$33,060). Not necessarily. Cost of living for a town or city would be one critically important factor to consider along with annual earnings.

**Sources and References**

1. U.S. Department of Labor, Bureau of Labor Statistics: <http://www.bls.gov>
2. U.S. Department of Labor, Bureau of Labor Statistics. (2001). *Highlights of Women's Earnings in 2000*. Available at <http://www.bls.gov>.
3. U.S. Department of Labor, Women's Bureau: <http://www.dol.gov/dol/wb/>

**Selected Resources**

1. movingvan.com web site's "Career & Salary by Location":  
<http://www.movingvan.com/tools/CareerTool.cfm>
2. U.S. Department of Labor, Bureau of Labor Statistics: <http://www.bls.gov>
3. U.S. Department of Labor, Women's Bureau: <http://www.dol.gov/dol/wb/>