

# Ohio Job Outlook

## 2014



## Executive Summary



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## Preface

The Bureau of Labor Market Information has been developing projections of the Ohio economy for several decades. People who use the outlook information include: individuals planning their careers and choosing among the wide variety of education and training options available to them; educational program planners developing curricula and courses of training; administrators and legislators responsible for government policies; and business executives planning marketing and personnel strategies. The changing industrial structure of the economy will be affecting the number of jobs available by occupation. Information about such change is important to people making decisions about their own future or the future of where they work.

Employment projections represent employers' needs for workers who have the skills to produce goods and services their customers want. State models used to develop these projections make use of the Bureau of Labor Statistics' techniques that translate the demand for goods and services into jobs. Individual industries are analyzed according to whether the goods or services are destined for a local market, like grocery stores or restaurants, or for export, either outside Ohio or overseas. The 2001 recession has had a greater and longer lasting effect on Ohio than the nation as a whole and most other states. These projections for Ohio reflect the latest trends and the expected impact of major downsizing in the motor vehicle industry.

Occupational projections incorporate analytical decisions made at the national level regarding the effects of technological change, organizational structure, and shifts in demand. A feature of the occupational analysis is the concept of educational clusters.<sup>1</sup> This describes the educational attainment of 25-44 year olds for each occupation. The categories are: high school, some college and college as well as combinations. A single category is listed if at least 60 percent of the people in that occupation have attained that level of education. When two or more educational categories are listed, it means that at least 20 percent of the people currently working in that occupation have that level of education. For example, for electricians the most significant source of postsecondary training is long-term on-the-job training. However, the educational attainment of 25-44 year-old electricians is almost evenly split between high school and some college. Therefore, electricians are in the high school/some college cluster.

Educational clusters provide an improved picture of entry paths for an occupation. This information complements the traditional method of assigning an occupation by the most significant single source of postsecondary education or training.

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<sup>1</sup> U.S. Department of Labor's Bureau of Labor Statistics *Occupational Projections and Training Data*, Chapter I at <http://stats.bls.gov/emp/optd/home.htm>.

This executive summary highlights the demand for employment in Ohio to 2014. More detailed information on the projected demand for industry and occupational employment, a slide show and a high employment prospects table by education and training level are available at <http://lmi.state.oh.us/PROJ/Projections.htm>. Data are also available to download from <http://OhioWorkforceInformer.org/> through the Data Query menu. The slide show and “Labor Force Table” for Ohio also document the continued aging of the Ohio workforce.

## Overview

In the last three years, Ohio's unemployment rate has been higher than the U.S. rate; before that Ohio's rate tended to be slightly lower. Because of slower growth in Ohio's population and income than is expected nationally, overall employment in Ohio is projected to grow at a slower rate than nationally. Over the 2004-2014 period, the Ohio economy is projected to create approximately 425,000 new jobs, primarily in the service-providing industries.

This report highlights findings on three aspects of Ohio's future outlook. In the first section, economic trends, we look at population and income and how these factors affect demand for products and services, in terms of Ohio's relationship to the national economy. The next section presents projected changes in industry employment. The outlook for specific occupations or jobs is the focus of the final section. In this section, attention is paid not only to the growth or decline of each occupation, but also to the number of annual openings and the average hourly wage. Educational levels are discussed both in terms of educational and training level needed for an occupation and educational attainment usual for people already in a job. This section also presents the occupations that have the highest prospects, based on both wage and annual openings, between now and 2014.

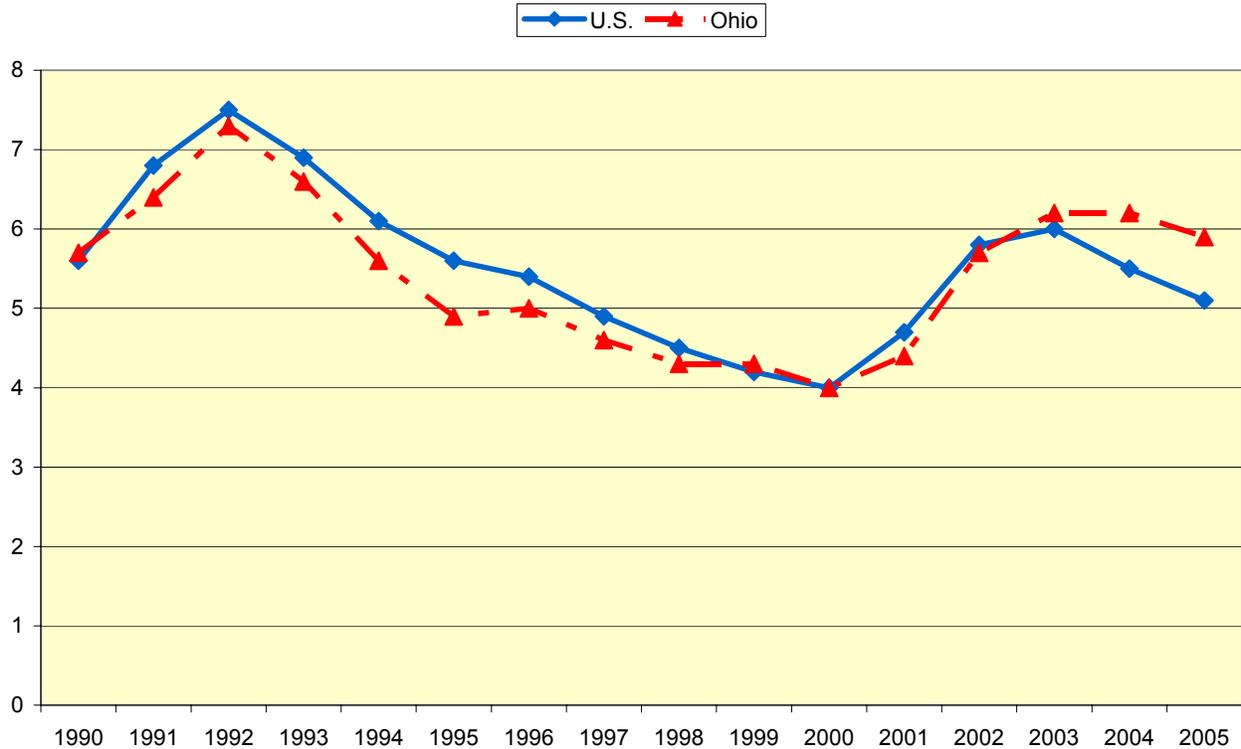
Although the labor market in Ohio is still feeling the effects of the 2001 recession, employment will continue to increase at a slow rate. On average between 2004 and 2014, the Ohio economy is expected to have about 190,000 annual openings. Most job openings will result from the need to replace workers who leave the labor force, usually upon retirement or transfer to another occupation. Over three out of every four openings in Ohio are expected to be net replacement needs. Therefore, even declining occupations may provide substantial opportunities for employment. Health and computer-related occupations dominate the list of fastest growing jobs.

In general, the Ohio economy will provide jobs for workers at all educational levels, but individuals with more education and training will enjoy better job opportunities. Growth rates over the 2004-2014 period are 13.5 percent for those occupations requiring any level of postsecondary training. This compares to 4.9 percent for those occupations that usually require on-the-job training or experience in a related occupation. Occupations that generally require moderate-term on-the-job training for a worker to achieve average job performance are projected to grow the slowest, reflecting the concentration of many production occupations in declining manufacturing industries. Educational cluster analysis also reinforces the point that all categories that require at least postsecondary training are expected to grow faster than the Statewide average. This analysis shows the highest projected rate of job growth is for categories where most workers have some college or a college degree.

# Ohio Economic Trends

Through 2005 the Ohio job market was still suffering from the effects of the 2001 recession with lackluster job growth. The number of Ohioans unemployed and the unemployment rate continued to remain high, 349,900 and 5.9 percent, respectively. In the last three years, Ohio's unemployment rate has been higher than the U.S. rate and the gap has widened.

**Ohio and United States Unemployment Rates, 1990-2005**



The economy's need for workers stems from the demand for goods and services, which is measured by gross domestic product at the national level and gross state product for Ohio. Changes in demand for specific goods and services have a major effect on changes in the quantity of goods and services produced by specific industries. Ohio ranks seventh in the country in gross state product, the value of output produced by a state, and accounts for 3.6 percent of the U.S. Gross Domestic Product.<sup>2</sup> In 2005, growth in Ohio's valuation of output lagged national growth, a 1.0 percent increase compared to 3.5 percent for the U.S. In 2004, the difference was not as great: U.S. output grew 4.2 percent compared to 3.0 percent for Ohio.

Demand for many goods and services are based largely on consumption expenditures by the local population. For example, employment in grocery stores, restaurants, bookstores, hospitals, and similar establishments depends on the

<sup>2</sup> Bureau of Economic Analysis, *BEA News*, June 6, 2006.

needs and wants of people living in the area who have money to spend. So population and income are two of the primary factors determining local demand.

Ohio's population has been increasing for the past decade and will continue to rise, but at a slower rate than the U.S. population. Ohio income will decline as a share of national income because of slower growth in population than is occurring in other parts of the country, especially the South and West. Likewise, per capita income relative to the U.S. is expected to decline somewhat.<sup>3</sup>

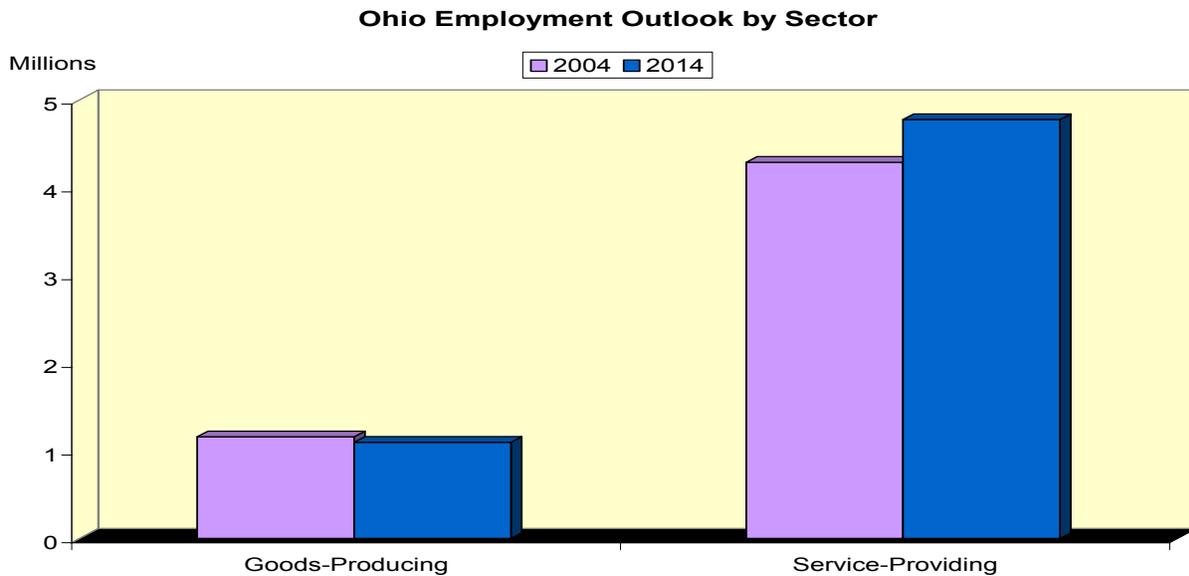
Expected declines in both of these factors affecting demand will contribute to overall employment growth in Ohio occurring at a slower rate than is projected nationally. One of the underlying causes is the announced downsizing of the motor vehicle and parts industry.

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<sup>3</sup> Global Insight, Long Trend Forecast, Spring 2006.

# Ohio Industry Employment

Over the 2004-2014 period, the Ohio economy is projected to create approximately 425,000 new jobs, primarily in the service-providing industries. Goods and services are produced in offices, factories, stores, and other work places. All goods and services are classified into an industry based on their type. For example, factories assembling cars are in the motor vehicle manufacturing industry, and supermarkets are in the grocery store industry. For analytical purposes, most industries fall into the goods-producing or the service-providing sector.



This job outlook was produced under the North American Industry Classification System (NAICS). The divisions within the goods-producing sector are natural resources, including agriculture and mining; construction; and manufacturing. In the service-providing sector, the divisions are wholesale and retail trade; transportation and utilities; information; financial activities; professional and business services; education and health services; leisure and hospitality; other services, except public administration; and government.

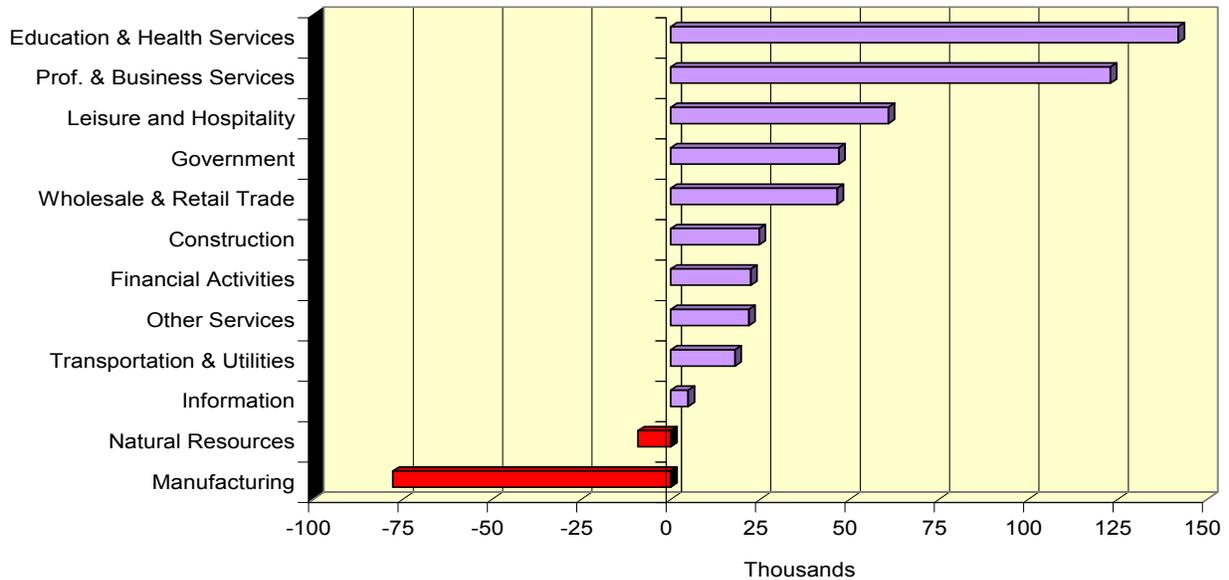
Changes in demand for an industry's products, due to shifts in consumer preferences or government priorities, constitute the most important cause of differences in employment growth rates among industries. Technological change is another factor affecting industry employment change. For example, automated equipment in manufacturing plants enables fewer workers to produce more goods, and its use is a major reason for declining employment in manufacturing.

## Major Industries

The number of jobs for Ohioans is anticipated to rise from 5.822 million in 2004 to 6.248 million by 2014. Service-providing industries will account for virtually all of the job growth; construction is the only goods-producing sector expected to add jobs. Education and health services will add one of every three new jobs,

while more than one in four jobs will be gained in professional and business services. Large numbers of jobs are also projected in leisure and hospitality, primarily food services; local government, principally in education; and wholesale and retail trade. Construction employment, financial activities and other services are each projected to add more than 20,000 new jobs by 2014. Also growing are transportation & utilities and information. Manufacturing and natural resources are projected to lose employment.

**Ohio Employment Outlook by Major Industry, 2004-2014**



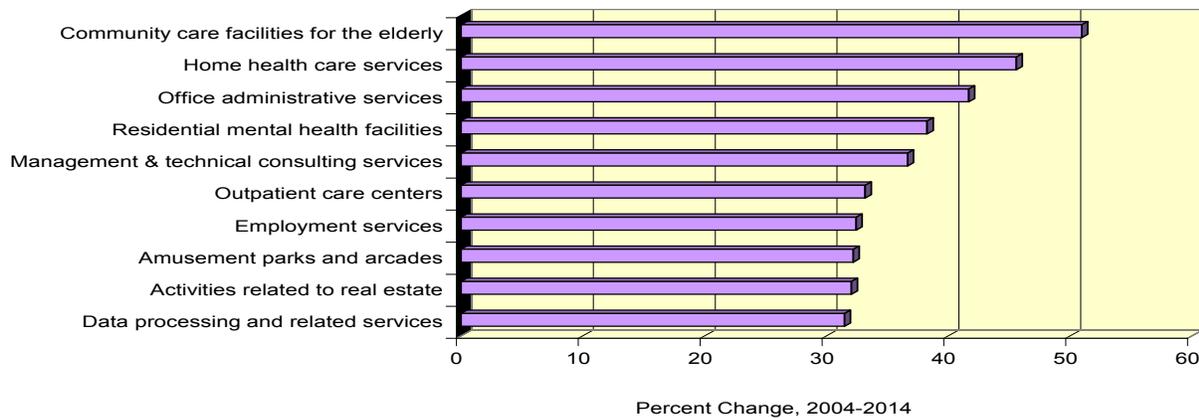
In Ohio, two-thirds of manufacturing employment is in production of durable goods, like machinery, motor vehicles and steel. Ohio also has a higher concentration of employment in manufacturing than most other states. The downside to having generally high paying manufacturing jobs is that they are more negatively impacted by business cycles. With the latest announcements of downsizing and plant closings in the motor vehicle and parts industries, Ohio manufacturing employment is projected to continue ratcheting downward.

## Ohio Employment Projections by Major Industry

Major Industry	2004 Annual Employment	2014 Projected Employment	Change in Employment 2004-2014	Percent Change 2004-2014
<b>Total</b>	<b>5,822,100</b>	<b>6,247,900</b>	<b>425,800</b>	<b>7.3%</b>
<b>Goods-Producing Industries</b>	<b>1,159,500</b>	<b>1,097,500</b>	<b>-62,000</b>	<b>-5.3%</b>
Natural Resources, inc. Agriculture and Mining	100,800	91,700	-9,100	-9.0%
Construction	234,700	259,500	24,800	10.6%
Manufacturing	824,000	746,300	-77,700	-9.4%
<b>Service-Providing Industries</b>	<b>4,288,600</b>	<b>4,775,200</b>	<b>486,600</b>	<b>11.3%</b>
Wholesale and Retail Trade	853,400	900,000	46,600	5.5%
Transportation and Utilities	186,000	204,000	18,000	9.7%
Information	92,800	97,700	4,900	5.3%
Financial Activities	312,100	334,500	22,400	7.2%
Professional and Business Services	624,600	747,600	123,000	19.7%
Educational and Health Services	740,200	882,200	142,000	19.2%
Leisure and Hospitality	495,600	556,500	60,900	12.3%
Other Services, except Government	228,200	250,100	21,900	9.6%
Government	755,700	802,700	47,000	6.2%
<b>Self-Employed, Private Household &amp; Unpaid Family Workers</b>	<b>374,000</b>	<b>375,200</b>	<b>1,200</b>	<b>0.3%</b>

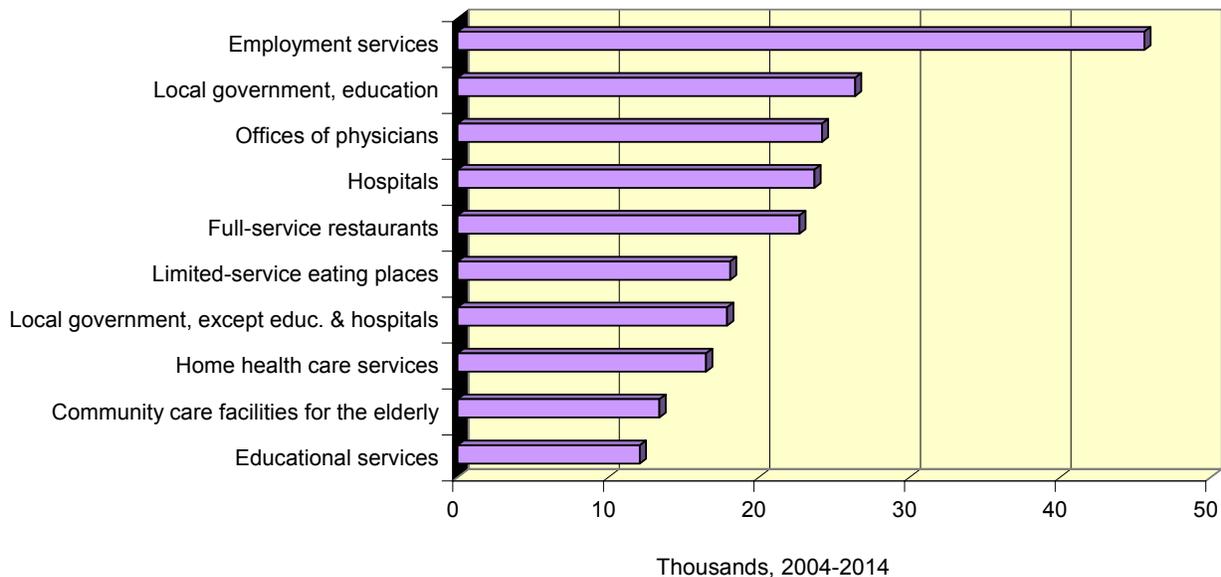
**Specific Industries with High Growth:** At a more detailed level, the fastest growing industry is expected to be community care facilities for the elderly with better than 50 percent growth expected between 2004 and 2014. Two of the next three industries are also health care related. Demand for health care and social assistance will increase because of the growth of the older population. Unlike in recent past projections, only one of the top ten fastest growing industries is computer related. The highest computer related industry is data processing, which is tenth, followed by computer system design at eleventh.

**Ohio Industries with the Fastest Job Growth**



**Most New Jobs:** Industries with rapid job growth offer good job prospects. However, industries employing a lot of workers with more moderate growth may offer more opportunities. Employment services is expected to add 45,600 new jobs between 2004 and 2014; food services and drinking places are expected to add 44,500 new jobs, the majority (22,700) in full service restaurants. Large numbers of new jobs are also projected in the private health care industry, most notably in nursing and residential care facilities (27,000), offices of physicians (24,200), hospitals (23,700) and home health care services (16,500). In addition, local government education is projected to add 26,400 new jobs. These industries, which are displayed in the table below, account for close to half of the new jobs that will be added over the next 10 years.

**Ohio Industries Adding the Most New Jobs**



**Replacement Needs:** Plant closings, changes in business practices, such as outsourcing or relocating production to more effective locations, and productivity increases are also having a significant impact on Ohio’s manufacturing employment. While employment in Ohio’s manufacturing sector will continue to experience structural declines, there will still be many job openings even though employment is expected to fall to about 750,000. The employees who remain in manufacturing will tend to be more highly skilled, productive and higher paid. As workers of the baby-boom generation begin to retire in larger numbers, the biggest challenge for Ohio’s employers will be finding skilled, well-trained workers.<sup>4</sup>

<sup>4</sup> *The Graying of the Ohio Labor Force: Demographic Changes to 2012*, The Ohio Department of Job and Family Services, Bureau of Labor Market Information, October 2004.

**High Employment Prospects:** There are some industries that are expected to have both a high rate of growth and a large number of annual openings. The next table presents these industries with high employment ‘prospects’. It includes mainly business and health related industries.

<b>Ohio Industries with High Employment Prospects*</b>					
<b>NAICS Code</b>	<b>Industry Title</b>	<b>2004 Annual Employment</b>	<b>2014 Projected Employment</b>	<b>Change in Employment 2004-2014</b>	<b>Percent Change 2004-2014</b>
5613	Employment services	140,600	186,200	45,600	32.4%
6211	Offices of physicians	81,000	105,200	24,200	29.9%
6216	Home health care services	36,200	52,700	16,500	45.6%
6233	Community care facilities for the elderly	26,300	39,700	13,400	51.0%
5415	Computer systems design & related services	39,000	50,700	11,700	30.0%
6232	Residential mental health facilities	23,000	31,800	8,800	38.3%
5416	Management & technical consulting services	22,100	30,200	8,100	36.7%
6244	Child day care services	25,100	32,600	7,500	29.9%
6214	Outpatient care centers	21,100	28,100	7,000	33.2%
493	Warehousing and storage	26,000	32,700	6,700	25.8%
5611	Office administrative services	14,400	20,400	6,000	41.7%
5313	Activities related to real estate	15,600	20,600	5,000	32.1%

\* These industries are expected to grow by at least 25 percent and create at least 5,000 new jobs.

# Ohio Occupational Employment

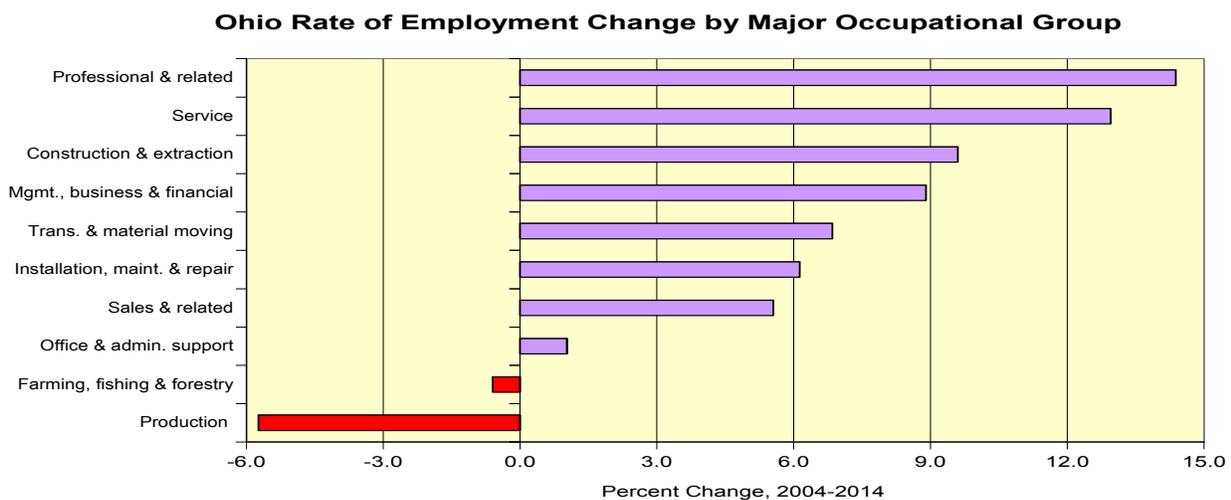
The previous section presented the outlook for labor demand in Ohio by industry. Because the mix of occupations is different within each industry, the demand for the occupations concentrated in an industry rises or falls with the fortunes of that industry. In this way, the economy’s occupational and industry structure form a close relationship.

Although the labor market in Ohio has been slow to recover since the 2001 recession, employment is expected to continue to grow although at a slow pace. On average, between 2004 and 2014, the Ohio economy is expected to have about 190,000 annual openings. Most job openings will result from the need to replace workers who leave the labor force, usually upon retirement, or transfer to another occupation. More than three-fourths of the openings in Ohio are expected to be net replacement needs.

Identifying occupations that have more favorable job prospects is important in career decision-making. This section presents the job outlook in Ohio by type of work and by education and training level. Changes in technology, business practices, and operations affect how employers structure staffing to improve productivity. For example, technological advances will continue to reduce the need for telephone operators; word processors and typists; travel agents; and order clerks. In general, the Ohio economy will provide jobs for workers at all educational levels, but individuals with more education and training will enjoy better job opportunities.

## Type of Work

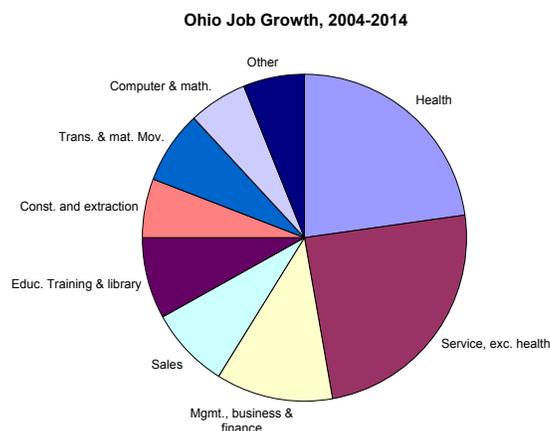
We group occupations by type of work performed to gain a better understanding of broad occupational employment trends. Two groups, professional & related occupations and service occupations, are the largest two categories in terms of current employment and projected job growth. Together these two groups—on



opposite ends of the educational attainment and earnings spectrum—are expected to provide almost 70 percent of the total job growth, 150,690 and 145,090 jobs respectively. Two other major groups are expected to grow faster than the Statewide average of 7.3 percent: construction and extraction occupations, 9.6 percent; and management, business and financial occupations, 8.9 percent. Slow-growing occupational groups are transportation and material moving occupations; installation, maintenance and repair occupations; sales and related occupations; and office and administrative support occupations. The remaining two groups, production and farming, fishing and forestry, are expected to have declining employment.

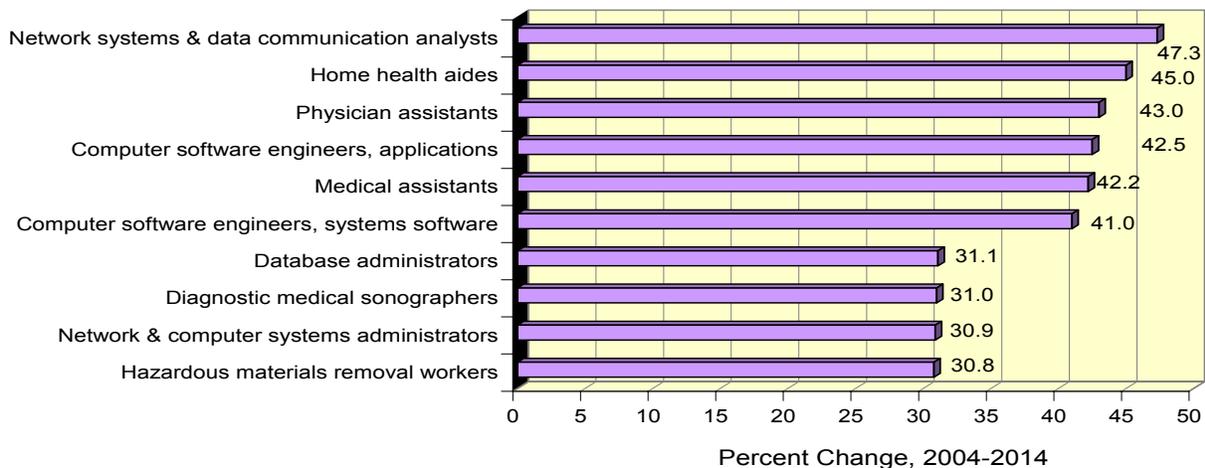
Ohio Occupational Employment Projections by Major Occupational Group					
Occupational Group	Employment		Change in Employment		Total Annual Openings
	2004 Annual	2014 Projected	2004-2014	Percent Change	
Total, All Occupations	5,822,100	6,247,900	425,800	7.3%	190,089
Management, Business and Financial	565,000	615,300	50,300	8.9%	15,253
Professional and Related	1,047,930	1,198,620	150,690	14.4%	35,645
Service	1,120,460	1,265,550	145,090	12.9%	46,520
Sales and Related	603,970	637,530	33,560	5.6%	23,504
Office and Administrative Support	924,840	934,360	9,520	1.0%	25,538
Farming, Fishing and Forestry	14,900	14,810	-90	-0.6%	429
Construction and Extraction	259,180	284,070	24,890	9.6%	7,507
Installation, Maintenance and Repair	237,530	252,100	14,570	6.1%	7,051
Production	591,730	557,770	-33,960	-5.7%	14,711
Transportation and Material Moving	456,540	487,800	31,260	6.8%	13,936

**High Growth Rates:** Health and computer-related occupations dominate the list of fastest growing jobs. Health occupations will account for 23 percent of net job growth. Service occupations, except health, will account for another 24 percent of job growth. In addition to professional and service occupations, the other groups expected to grow faster than average are construction and extraction occupations; and management, business and financial occupations.



Of the ten fastest growing jobs, nine are either in health or computer related occupations. These ten occupations all have growth rates at least four times higher than the rate for all occupations of 7.3 percent. Most of these high growth occupations require a bachelor's degree.

**Fastest Growing Jobs in Ohio**



**Annual Openings:** New job growth is one component of occupational demand, but a larger source of job openings is net replacement needs. More than three-fourths of the job openings are expected to result from the need to replace workers who leave the labor force or transfer to another occupation. Therefore, even declining occupations may provide substantial opportunities for employment. Many occupations with the most annual openings (see next page) have high employment and high replacement needs and tend to be lower-skilled. Many of these jobs are entry level and a worker can expect occupational mobility as they achieve more education and training.

Within Ohio and nationally, sales occupations are at the top of the list in terms of occupations with the most annual job openings. The top two occupations are cashiers and retail salespersons, followed by two food service occupations: waiters and waitresses and combination food preparation and serving workers, including fast food. The other occupations that make up the top ten are laborers, freight, stock, material movers, hand; registered nurses; janitors and cleaners; customer service representatives; general office clerks; and stock clerks and order fillers. Team assemblers, truck drivers, teachers, secretaries, child care workers and accountants are examples of other occupations with many annual openings.

Most health occupations are growing and have a large number of annual openings. Therefore, they will account for many job opportunities for Ohioans, in large part because of the need to care for an aging population with a longer life expectancy combined with medical advances that make new treatments available.

<b>Occupations in Ohio with the Most Annual Job Openings, 2004-2014</b>		
<b>Occupation</b>	<b>Annual Openings</b>	<b>Average Wage 2006*</b>
Retail Salespersons	8,201	\$11.11
Cashiers	6,864	\$8.00
Waiters and Waitresses	5,799	\$7.03
Comb. Food Preparation & Serving Workers, inc. Fast Food	5,208	\$7.25
Laborers and Freight, Stock, and Material Movers, Hand	5,010	\$11.41
Registered Nurses	4,630	\$26.09
Janitors/Cleaners, except Maids & Housekeeping	3,008	\$11.00
Customer Service Representatives	2,643	\$14.49
Office Clerks, General	2,641	\$11.25
Stock Clerks and Order Fillers	2,368	\$10.55
Sales Rep., Wholesale & Mfg, ex. Tech. & Scientific Products	2,282	\$28.82
Team Assemblers	2,241	\$14.09
Nursing Aides, Orderlies and Attendants	1,994	\$10.79
Home Health Aides	1,973	\$9.42
Truck Drivers, Heavy and Tractor-Trailer	1,960	\$17.87
Food Preparation Workers	1,938	\$8.45
Postsecondary Teachers	1,922	\$59,794**
General and Operations Managers	1,894	\$45.63
Cooks, Fast Food	1,714	\$7.36
Secondary School Teachers, except Special & Vocational Ed.	1,696	\$48,874**
Accountants and Auditors	1,654	\$27.20
Child Care Workers	1,641	\$8.70
Maintenance and Repair Workers, General	1,610	\$16.25
Elementary School Teachers, except Special Education	1,581	\$48,077**
Secretaries, except Legal, Medical & Executive	1,554	\$13.52
Landscaping and Groundskeeping Workers	1,536	\$10.70
Bookkeeping, Accounting and Auditing Clerks	1,525	\$14.47
Receptionists and Information Clerks	1,453	\$10.56
Executive Secretaries & Administrative Assistants	1,404	\$18.13
Tellers	1,374	\$10.84

\*May 2005 wages aged to April 2006.

\*\*Annual earnings, typically for a 9½ month school year for teachers.

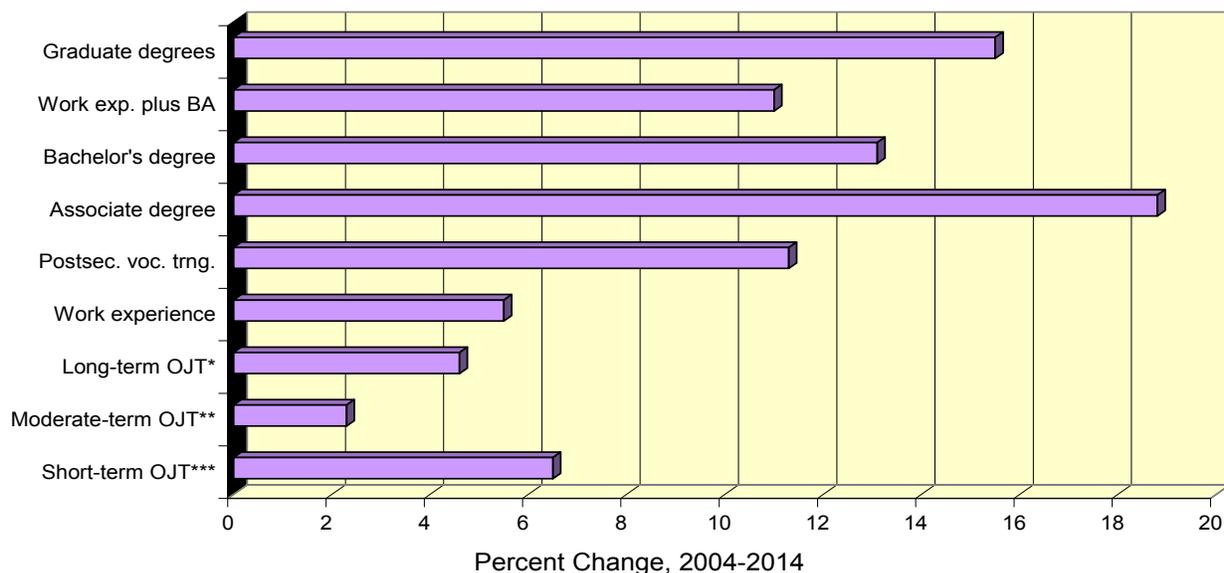
Many occupations are expected to have less employment by 2014, losing a total of almost 95,000 jobs. These occupations include electrical and electronic equipment assemblers; farmers and ranchers; stock clerks and order fillers; press machine operators and tenders; and secretaries, except legal, medical and executive. However, because of replacement needs even declining occupations can provide opportunities for employment. These five occupations alone are expected to provide approximately 5,000 annual openings.

When making a career decision, it is important to look at both the employment growth rate and total job openings to assess future job prospects. In general, jobs with fast growth rates offer good job opportunities. However, large slowly or moderately growing occupations often provide many more job openings than small, fast growing occupations. For example, physician assistants are expected to grow by 43 percent with 125 job openings a year, while retail salesperson are expected to grow by only 13 percent, but will provide 8,200 openings per year.

### Education and Training Level

In general, the Ohio economy will provide jobs for workers at all educational levels, but individuals with more education and training will enjoy better job opportunities. Growth rates over the 2004-2014 period will range from 2.3 percent for occupations requiring moderate-term on-the job training to 18.8 percent for occupations requiring an associate degree for entry.

**Ohio Employment Growth by Education and Training Levels**



\* Long-Term on-the-job training is twelve months or more of combined experience and training.  
 \*\* Moderate-Term on-the-job training is one to twelve months, combined experience and training.  
 \*\*\* Short-Term on-the-job training is up to one month.

Education will play a bigger role in the Ohio workplace. All categories that generally require at least postsecondary training are projected to grow faster than the 7.3 percent average for all occupations. Occupations that generally require moderate-term on-the-job training for a worker to achieve average job performance are projected to grow the slowest, reflecting the concentration of many production occupations in declining manufacturing industries.

**Educational Cluster:** Another way of looking at job requirements is to look at the educational attainment of people working in a given occupation who are 25-44. This is called an educational cluster analysis and divides attainment into three

groups: high school, some college, and college.<sup>5</sup> In order for a single category to be listed, at least 60 percent of a given occupation has to have that level of education; for multiple levels, at least 20 percent. Education and training levels indicate the most significant source of postsecondary training needed for entry into an occupation. For example: for electricians the most significant source of education and training is long-term on-the-job training. However, the educational attainment of 25-44 year old electricians is almost evenly split between high school and some college. Therefore, electricians are in the high school/some college cluster. The 25-44 year old age group was selected because it would more closely match the education of those wanting to enter the field.

This educational cluster analysis shows the highest projected rate of job growth (16.2 percent) is for the category where most workers have some college/college. This is followed by 13.1 percent growth for occupations where the workers have a college education.

<b>Ohio 2004 Employment and Growth By Educational Cluster</b>			
<b>Educational Cluster</b>	<b>2004 Employment</b>	<b>Growth Rate 2004-2014</b>	<b>Annual Openings</b>
High School	742,490	5.9%	23,424
High School/Some College	2,920,840	4.3%	94,313
High School/Some College/College	909,730	8.2%	29,802
Some College/College	624,450	16.2%	21,705
College	624,540	13.1%	20,885

High school is the usual education attained for only one in seven occupations. On the whole then, workers with higher levels of education have more options in the job market and better prospects for obtaining higher paying jobs than less educated individuals.

### **High Employment Prospects**

A high prospect occupation is defined as an occupation that pays at least \$12 an hour and has at least 75 annual openings. The final table, on the next page, provides a sample of occupations that have high employment prospects in the State of Ohio by education and training level. The best example of a high prospect occupation is a registered nurse, which is projected to have over 4,600 annual openings and had an average salary in 2006 of \$26.09 an hour. Other examples are truck drivers; customer service representatives; construction trades; automotive service technicians and mechanics.<sup>6</sup>

<sup>5</sup> U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Projections and Training Data, 2006-07 Edition*, February 2006, Bulletin 2602, page 2.

<sup>6</sup> For a complete list of high prospects, please visit our website: <http://lmi.state.oh.us/PROJ/Projections/Ohio/HighOccupationalProspects.pdf>

<b>Occupations in Ohio with High Employment Prospects</b>		
<b>Title</b>	<b>Annual Openings</b>	<b>Average Wage 2006</b>
<b>Short-Term On-the-Job Training</b>		
Truck Drivers, Light or Delivery Services	893	\$13.71
Bill and Account Collectors	730	\$13.96
Bus Drivers, School	702	\$12.01
<b>Moderate-Term On-the-Job Training</b>		
Customer Service Representatives	2,643	\$14.49
Sales Rep., Wholesale/Mfg, ex. Tech./Sci. Prod.	2,282	\$28.82
Team Assemblers	2,241	\$14.09
Truck Drivers, Heavy and Tractor-Trailer	1,960	\$17.87
Maintenance and Repair Workers, General	1,610	\$16.25
Secretaries, ex. Legal, Medical & Executive	1,554	\$13.52
Bookkeeping, Accounting and Auditing Clerks	1,525	\$14.47
Executive Secretaries & Administrative Assistants	1,404	\$18.13
<b>Long-Term On-the-Job Training</b>		
Carpenters	1,283	\$17.56
Electricians	896	\$22.51
Police and Sheriff's Patrol Officers	873	\$20.96
Fire Fighters	852	\$16.55
Plumbers, Pipefitters and Steamfitters	782	\$22.34
<b>Work Experience in a Related Occupation</b>		
FL Sup/Mgrs of Food Prep. & Serving Workers	1,160	\$13.64
First-Line Superv./Mgrs of Retail Sales Workers	1,152	\$18.24
First-Line Sup/Mgrs of Office & Admin. Support	1,131	\$21.37
FL Sup/Mgrs of Production/Operating Workers	860	\$24.15
<b>Post-Secondary Vocational Training</b>		
Automotive Service Technicians and Mechanics	1,211	\$16.66
Licensed Practical & Licensed Vocational Nurses	1,204	\$17.86
Medical Secretaries	752	\$12.68
<b>Associate Degree</b>		
Registered Nurses*	4,630	\$26.09
<b>Bachelors Degree</b>		
Secondary Sch. Teachers, ex. Spec. & Voc. Ed.	1,696	\$48,874**
Accountants and Auditors	1,654	\$27.20
Elementary School Teachers, ex. Special Educ.	1,581	\$48,077**
Computer Software Engineers, Applications	798	\$35.10
<b>Work Experience Plus Bachelors Degree</b>		
General and Operations Managers	1,894	\$45.63

\*Training is met through a two-year associate degree; a three-year diploma; or a four-year bachelor's degree.

\*\*Annual earnings, typically for a 9½ month school year for teachers.

## Technical Notes

Projections of employment demand were made at the 4-digit industry level, based on the North American Industry Classification System (NAICS) using single-equation regression models. These models related Ohio industry employment to national industry employment and other key economic determinants for Ohio, especially income and population. National projections of industry demand, published in the November 2005 issue of *The Monthly Labor Review*, were a key input.

Occupational estimates were derived by creating an industry-occupation matrix with occupational data supplied by Ohio employers from the Occupational Employment Statistics (OES) surveys for 2002, 2003 and 2004 reflecting the Standard Occupational Classification (SOC) coding structure. These industry staffing patterns were adjusted for expected technological change and other factors from national data provided by the Bureau of Labor Statistics in projecting occupational demand.

Net annual replacement needs were computed from national rates also supplied by the Bureau of Labor Statistics and published in *Occupational Projections and Training Data, 2006-2007 Edition*, U.S. Department of Labor, Bureau of Labor Statistics. Although these rates have been found to provide reliable estimates of Ohio's replacement needs for specific occupations, there are many additional openings resulting from turnover.

The source of the wage estimates is the May 2005 Occupational Employment Statistics (OES) wage survey for Ohio. These estimates have been aged to April 2006 using the Employment Cost Index, through the Estimates Delivery System (EDS). The analysis by education and training level is made possible by the classification of the OES occupations into eleven distinct categories by the staff at the Office of Economic Projections at the Bureau of Labor Statistics.

The accuracy of projections for individual industries and occupations is subject, of course, to error because of the many unknown factors that will affect the economy over the projection period. Furthermore, while occupational employment projections and related job outlook information can provide valuable inputs to the career decision-making process, they should not be the sole basis for a choice of career.

## Additional Information

More detailed information on Ohio's 2004-2014 projections is available through the query feature available through the Bureau of Labor Market Information of the Ohio Department of Job and Family Services (ODJFS) internet site at <http://OhioWorkforceInformer.org/>. Printed copies of this report and a companion pamphlet, *Occupational Trends, Ohio's Hot Jobs*, are available by contacting the Bureau of Labor Market Information at (614) 752-9494 or writing to ODJFS, Bureau of Labor Market Information, P.O. Box 1618, Columbus, Ohio 43216-1618.

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For further information, visit our website at <http://lmi.state.oh.us> or contact the Ohio Bureau of Labor Market Information at 1-888-2WORK-411 or 1-888-296-7541.

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