

# Ohio

## Health Care Employment

### Labor Market Trends and Challenges



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## Preface

The health care industry is remarkable in that it appears largely resilient to the economic cycles that affect the rest of Ohio and the United States.<sup>1</sup> The demand for health care is not tied to the general state of the economy, but rather to public health, age demographics, and government policy and expenditures. As Ohio's population grows older, largely through the aging of the baby boom age cohort and as new medical technologies emerge, demand for health care will continue to increase, continuing its role as a high-growth sector within the economy.

Section I contains a brief review of employment growth in health care industries over the past 30 years. Section II takes a closer look at the industries that make up the health care sector, comparing establishment size and relative importance in the economy. Section III examines the occupations that feed into the health care industries and projections for employment through 2014. Section IV addresses the educational and training needs for key health care occupations and gauges our educational system's ability to meet demand for training program graduates. Section V compares the health care labor markets in each of the state's twelve Economic Development Regions (EDRs). Finally, section VI contains final analysis and conclusions about health care employment in Ohio and its role in the state economy. The technical notes and references sections at the end of this report provide important information about the sources of information used and their relative strengths and limitations.

In Ohio and nationwide, health care will be a crucial employment sector in the years to come. Careful examination of these industries and the occupations that feed into them will allow the state to take full advantage of health care's economic buoyancy.

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<sup>1</sup> Goodman, 2006.

## Executive Summary

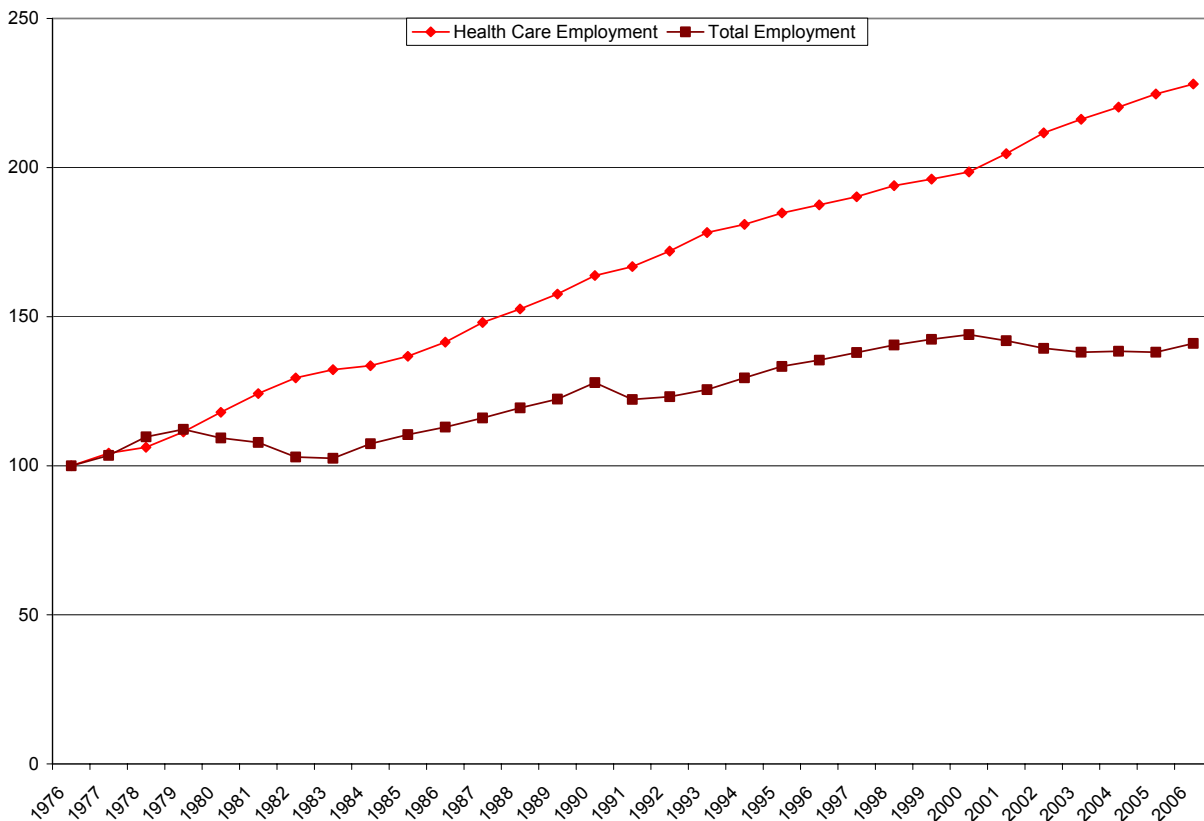
The health care industry appears largely resilient to economic cycles, and demand is tied mostly to public health, age demographics, and government policy and expenditures. Demand for health care services will continue to increase in the coming years, making it a crucial employment sector in Ohio.

- The phrase 'health care' in workforce development may refer to either a set of industries or occupations.
- The health care industry generally refers to three sectors: ambulatory health care services (NAICS 621), hospitals (NAICS 622) and nursing and residential care facilities (NAICS 623).
- From 1976 to 2006, employment in health care industries in Ohio has risen from 277,500 (one employee per 39 residents) to 633,000 (one employee per 18 residents), with little reaction to recessions in 1981, 1991, and 2001.
- The hospital sector is organized around a relatively small number of large establishments with large workforces, while ambulatory health care services and nursing and residential care facilities show an opposite pattern of numerous, small establishments with small workforces.
- Health care industries tend to have a bimodal distribution of average wages, with low-skilled, low-paying occupations on the one hand and high-skilled, high-paying occupations on the other.
- Compared to 15 export subsectors in Ohio, hospitals and nursing and residential care facilities have shown impressive employment growth from 2000 to 2006.
- There are 77 different occupations that may be considered health care occupations. Employment in these occupations is projected to grow 19.5 percent from 2004 to 2014, compared with 7.3 percent across all occupations.
- Four health care occupations are projected to be among the fastest-growing of all occupations: home health aides (45.0%), physician assistants (43.0%), medical assistants (42.2%) and diagnostic medical sonographers (31.0%).
- Six health care occupations had high proportions of incumbents ages 45 to 55 in 2000: psychologists (42.8%); medical and health service managers (35.1%); counselors (33.7%); speech-language pathologists (33.7%); licensed practical and vocational nurses (30.9%); and registered nurses (29.8%). Of the total workforce, 22.7 percent are in the 45-to-55 age group.
- There will be 22,176 projected annual openings in health care occupations from 2004 to 2014, 48.1 percent of which will be for replacement needs.
- Over one-quarter of the projected openings in health care will require less than a year of training. Around 3,000 annual openings will require a master's degree or higher.
- Although there is high demand for most health care occupations, there is concern whether the current educational infrastructure is sufficient to meet market demand for medical and clinical laboratory technologists, registered nurses and dental assistants.

# I. Health Care Trends

When we speak of health care, we may refer to a set of either industries or occupations. For industries these include ambulatory health care facilities; hospitals, both public and private; and nursing and residential care facilities. Figure 1 below compares the growth in these sectors with the growth across all industries. Total and health care employment levels were indexed or set equal to 100 for 1976. In 1976, there were 277,500 people employed in health care industries in Ohio. By 2006, this number had grown at a relatively linear rate to 633,000 people. While the growth in health care industries has been linear, with little reaction to economic cycles, total employment trends reflect the recessions of 1981, 1991 and 2001, along with the growth of the 1990s.

**Figure 1: Health Care and Total Employment Growth (Indexed to 100 in 1976) in Ohio**



Source: QCEW.

Another way to appreciate the growth in Ohio’s health care industries is to compare them to the population. In 1976, Ohio had a population of 10,753,000<sup>2</sup> and health care industry employment of 277,500—one employee in health care industries for every 39 people. Ten years later there was one employee for 27 people. Ten years after that, in 1996, there was one for every 22 people. Most recently, in 2006, the population was 11,478,000 and the health care

<sup>2</sup> U.S. Census Bureau, 2007.

industry's employment was 632,800, or one health care industry employee for every 18 people. In other words, health care industries have grown more than twice as fast as the population.

There is every reason to expect this growth will continue. Advances in medical technology and the aging of the population, whose health care needs are greater than the general population, should generate continued expansion. Expectations of public policy expanding health care coverage would further increase expenditures and utilization. In addition, since most of the health care industry cannot be outsourced, the growth will have to remain local.

## II. Industrial Makeup & Projections

At both the national and state levels, health care industries are projected to create more new jobs than any other major industry group—approximately three million new health care wage and salary jobs nationally between 2006 and 2016, and approximately 91,400 new jobs in the private health care system in Ohio from 2004-2014.<sup>3</sup> As mentioned earlier, health care is composed, in terms of employment, primarily of three sectors under the North American Industrial Classification System (NAICS): ambulatory health care services (NAICS 621), hospitals (NAICS 622), and nursing and residential care facilities (NAICS 623).

These three sectors have important similarities and differences related to their employment patterns. First, all three of these health sectors in Ohio enjoyed continuous employment growth patterns from 2000 to 2006 (Figures 2 through 4). They were impervious to the 2001 recession.<sup>4</sup>

The data shown in Figures 2 through 7 do not include state and local government-owned hospitals. Although public hospitals are a small share of the total sector, trend statistics are similar. In 2006, there were 54 state and local hospitals in Ohio with a combined 29,430 employees and \$1.32 billion in total wages. From 2000 to 2006, employment rose 9.5 percent and average weekly wages rose 27.9 percent.

Normally, industry employment counts in publicly owned establishments are treated separately from private establishments since they may not react similarly to economic cycles. However, statistics relating to occupational employment, staffing patterns and training requirements, as used later in this report, include data from all types of establishment ownership.

**Figure 2: Summary Profile of Ambulatory Health Care Services (NAICS 621)**

Year	Number of Establishments	Employees	Total Wages (thousands)	Average Annual Wage
2000	16,918	187,196	\$7,580,449	\$40,495
2001	17,058	190,572	\$8,051,639	\$42,250
2002	17,348	197,711	\$8,495,049	\$42,967
2003	17,628	203,774	\$8,851,097	\$43,436
2004	17,657	208,811	\$9,388,042	\$44,960
2005	17,836	216,033	\$9,858,473	\$45,634
2006	18,063	221,354	\$10,304,252	\$46,551
Absolute Change, 2000-06	1,145	34,158	\$2,723,803	\$6,056
Percent Change, 2000-06	6.8%	18.2%	35.9%	15.0%

Source: ODJFS, 2007a.

<sup>3</sup> U.S. Bureau of Labor Statistics [BLS], 2007a; Ohio Department of Job and Family Services [ODJFS], 2006b.

<sup>4</sup> According to the National Bureau of Economic Research (NBER, 2003), the last recession started in March 2001 and ended in November 2001, peak to trough.

**Figure 3: Summary Profile of Hospitals (NAICS 622)**

Year	Number of Establishments	Employees	Total Wages (thousands)	Average Annual Wage
2000	220	196,706	\$6,420,405	\$32,640
2001	225	203,015	\$6,856,892	\$33,775
2002	230	208,172	\$7,303,838	\$35,086
2003	221	211,670	\$7,775,848	\$36,736
2004	233	214,926	\$8,368,529	\$38,937
2005	221	218,632	\$8,788,419	\$40,197
2006	213	221,472	\$9,361,792	\$42,271
Absolute Change, 2000-06	-7	24,766	\$2,941,387	\$9,631
Percent Change, 2000-06	-3.2%	12.6%	45.8%	29.5%

Source: ODJFS, 2007a.

**Figure 4: Summary Profile of Nursing and Residential Care Facilities (NAICS 623)**

Year	Number of Establishments	Employees	Total Wages (thousands)	Average Annual Wage
2000	2,654	144,246	\$2,882,237	\$19,981
2001	2,841	150,117	\$3,116,604	\$20,761
2002	2,862	153,531	\$3,303,193	\$21,515
2003	2,940	156,599	\$3,464,872	\$22,126
2004	2,992	158,538	\$3,608,163	\$22,759
2005	3,131	159,700	\$3,658,056	\$22,906
2006	3,225	160,476	\$3,778,217	\$23,544
Absolute Change, 2000-06	571	16,230	\$895,980	\$3,563
Percent Change, 2000-06	21.5%	11.3%	31.1%	17.8%

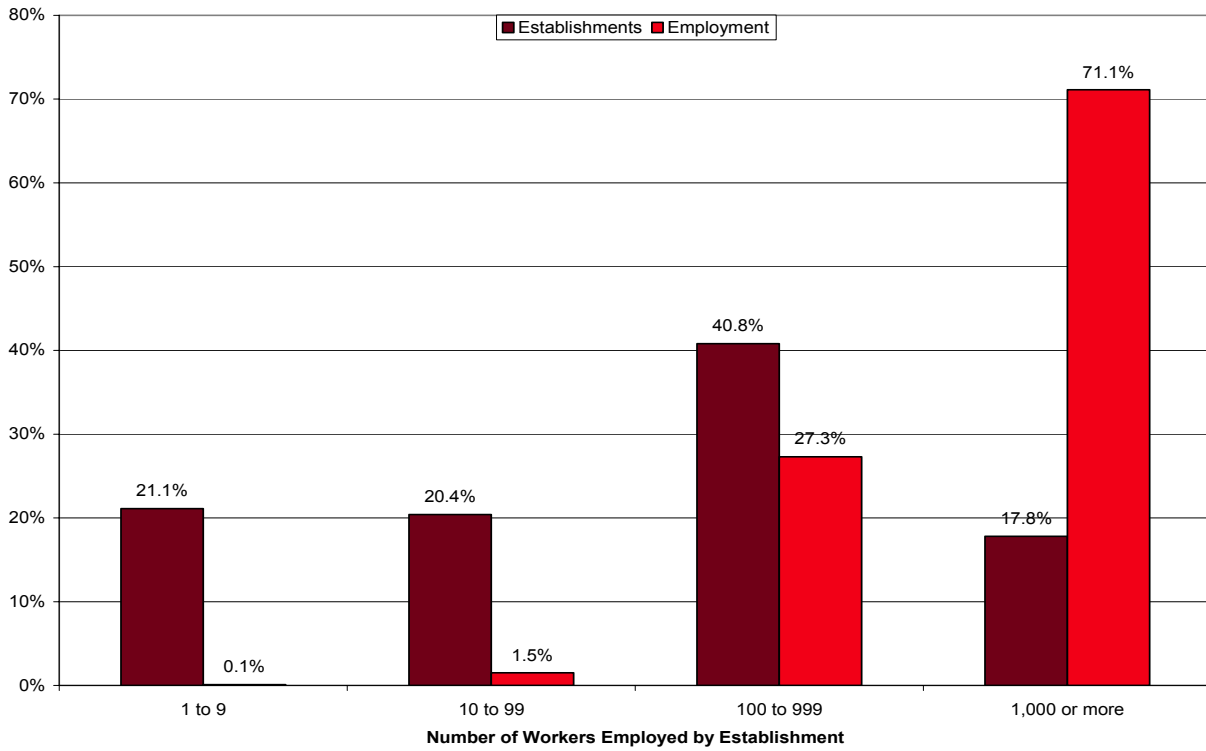
Source: ODJFS, 2007a.

Among the health care sectors, the organization of employment and number of establishments is markedly different for hospitals (Figure 5), in contrast to ambulatory health care services and nursing and residential care facilities (Figure 6). The hospital sector is organized around a relatively small number of establishments with very large workforces; the remainder of the health care industries are arranged in an opposite organizational pattern of numerous establishments with small workforces.<sup>5</sup> These contrasting organizational patterns have an impact upon the total wage package of workers and their respective training and advancement opportunities.

<sup>5</sup> BLS, 2007a.

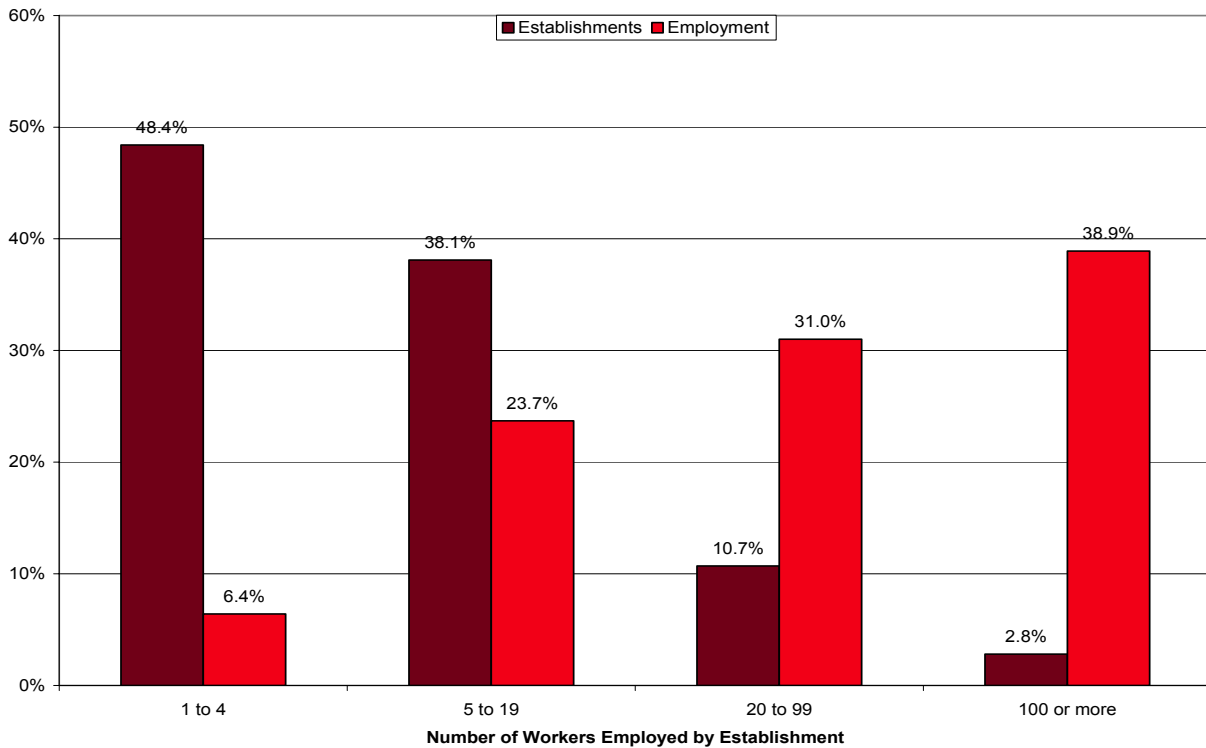


**Figure 5: Hospitals and Employment by Number of Workers**



Source: BLS, 2007a.

**Figure 6: Non-Hospital Health Services Establishments and Employment by Number of Workers**



Source: BLS, 2007a.

Similar to the distributions of establishment sizes within the health care industries, average annual wages also differ between the health care subsectors. Figure 7 below shows that, while ambulatory health care services and private hospitals both had average annual wages above the state average, nursing and residential care provided below-average annual wages. These annual averages, however, tend to obscure the bi-modal characteristics of wage distributions within health care industries. These subsectors include large numbers of both high-wage/high-skill occupations and low-wage/unskilled jobs. Individual occupations in health care are covered in greater detail in section III.

**Figure 7: 2006 Ohio Average Annual Wages by Industry Segment**

Code	Subsector/Segment	Average Annual Wage	Empl.
621	Ambulatory Health Care Services	\$46,551	221,354
6211	Offices of Physicians	\$70,109	80,719
6212	Offices of Dentists	\$41,052	30,232
6213	Offices of Other Health Practitioners	\$32,500	27,403
6214	Outpatient Care Centers	\$40,195	24,320
6215	Medical and Diagnostic Laboratories	\$41,620	7,150
6216	Home Health Care Services	\$22,549	40,484
6219	Other Ambulatory Health Care Services	\$29,464	11,046
622	Hospitals	\$42,271	221,472
6221	General Medical and Surgical Hospitals	\$42,374	217,634
6222	Psychiatric & Substance Abuse Hospitals	\$39,673	1,163
6223	Other Hospitals	\$34,973	2,676
623	Nursing and Residential Care Facilities	\$23,544	160,476
6231	Nursing Care Facilities	\$24,449	103,125
6232	Residential Mental Health Facilities	\$22,092	23,629
6233	Community Care Facility for the Elderly	\$21,337	28,887
6239	Other Residential Care Facilities	\$24,513	4,835

Shaded subsectors and segments have average wages above the state average \$38,600.

(Approx. \$19.28 per hour.)

Source: ODJFS, 2007a.

Many approaches to economic and workforce development start by classifying industries or sectors as local or export, using location quotients (LQs). A location quotient compares the concentration of an industry in an area to the concentration in a larger area, often the United States as a whole. Industries or sectors with high LQs, generally 1.2 or higher, are highly concentrated in an area and may be expected to bring new capital into the community from outside the local area.<sup>6</sup> The LQ for the hospital sector is 1.2 and the LQ for the nursing and residential care facilities sector is 1.4, meaning the concentration of these sectors in Ohio is higher than average.

Although most hospitals provide services only to their local areas, there are several reasons they can become export industries. Research and medical specialty facilities may attract both patients and financial support from outside of their local areas. Ohio is home to several health

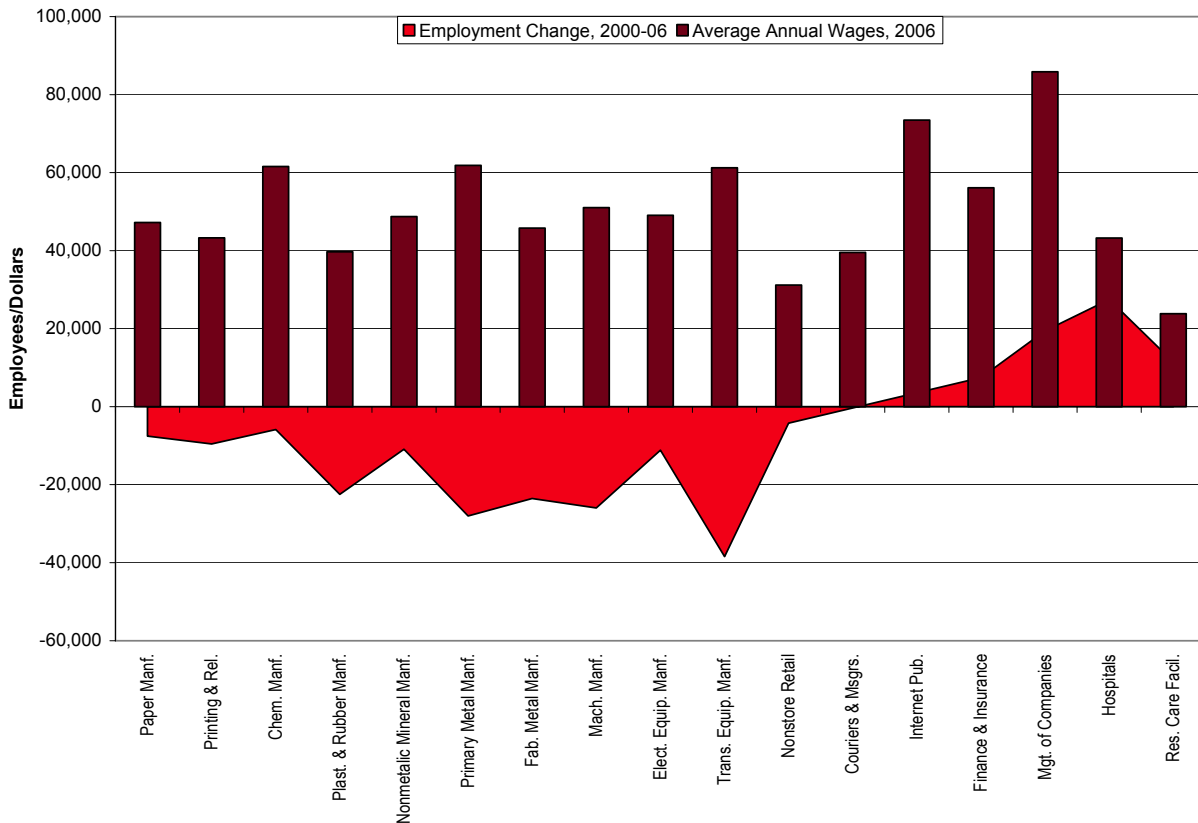
<sup>6</sup> ODJFS, 2004.

care research facilities and nationally recognized specialty hospitals.<sup>7</sup> It may be more effective to concentrate some aspects of health care centrally within a region rather than have assets spread across the region.

Other factors, such as population demographics or government policies, may explain the concentration of nursing and residential care facilities. The percentage of Ohioans 65 and older is above the national average, suggesting a higher-than-average need for health care. Ohio's health care policies may be attractive to some health care providers. Ohio Medicaid payments per older enrollee are above the national average.<sup>8</sup>

In Ohio, which has not yet recovered the overall employment lost in the 2001 economic recession, the positive employment growth of the hospitals and nursing and residential care facilities (NAICS sectors 622 and 623, respectively) is impressive relative to other Ohio industrial sectors. Figure 8 identifies 17 export sectors in Ohio, including hospitals and nursing and residential care facilities. Compared with many of Ohio's manufacturing industries, health care employment has fared very well between 2000 and 2006.

**Figure 8: Ohio Employment Change and Annual Wages for Export Sectors**



Includes 3-digit NAICS sectors with a location quotient greater than 1.2.  
Source: ODJFS, 2007a.

<sup>7</sup> America's Best Hospitals, 2007.  
<sup>8</sup> Kaiser Family Foundation, 2008.

The critical occupation for hospitals is the registered nurse (RN). For residential care facilities, the critical occupation is the licensed practical nurse (LPN).<sup>9</sup> These two occupations rank first in employment for skilled occupations within their sectors. Whether a result of high services demands of an aging population and shorter service-intensive stays in the hospital or financial incentives and government policy, hospital staffing patterns have changed significantly. An aging population has increased demand for hospital services. The funding reimbursement mechanisms used by the federal government for Medicare and by managed care programs have created a financial incentive for hospitals to keep patient stays as short as possible.<sup>10</sup> The result is that hospital patients require more highly skilled nursing than in the past, leading to increased employment of RNs by hospitals and decreased employment of LPNs.

In the Ohio hospital sector, employment of LPNs fell from 9.5 percent in 1980 to only 3.5 percent in 2004.<sup>11</sup> During the same period, employment of RNs grew from 21.2 percent of staff to 27.1. In addition, the concept of “magnet hospitals,” which create attractive and productive work environments for nurses, emphasizes a preference for Bachelor of Science in Nursing (BSN) registered nurses.<sup>12</sup> In the U.S. and Ohio, it is projected that RNs will represent about 30 percent of the hospital sector’s employment and that LPNs will represent between 11 and 13 percent of the nursing care facilities sector’s employment in 2014.<sup>13</sup> Although both occupations are critical for the delivery of health care, as will be discussed in the next section, the labor markets for RNs and LPNs in Ohio represent two extremes.

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<sup>9</sup> ODJFS, 2007b (pp. 8 & 12).

<sup>10</sup> Goodman, 2006.

<sup>11</sup> Kelley, Blaine, Sandver & Wilkens, 1980 (p. viii); ODJFS, 2007c.

<sup>12</sup> American Nurses Credentialing Center, 2008.

<sup>13</sup> BLS, 2006; ODJFS, 2006b.

### III. Occupational Outlook

Health care may refer to occupations as well as industries. In 2004, health care industries, including public hospitals, employed over 610,000 people. Health care occupations, on the other hand, account for over 590,000 people.

The difference in numbers can be explained by the fact that not all workers in health care occupations work in health care industries, while health care industries do not exclusively employ health care occupations. There is a large amount of overlap, but there are discrepancies. Registered nurses, for example, might work in a hospital or an elementary school. Conversely, a nursing care facility might employ both physical therapists and cafeteria cooks. Any examination of training needs will require a look at health care occupations.

Although advancements in technology have brought new and improved medical services to patients, most analysts of health care expect new technologies to have little impact upon overall employment levels. The Bureau of Labor Statistics notes the lack of significant technological effects upon health sector employment, particularly for home health care services; outpatient, laboratory, and other ambulatory care services; private hospitals; and residential care facilities.<sup>14</sup> Recent technologies such as computer-assisted diagnoses, dispensing of medications, and record keeping and sharing may improve services, but not necessarily efficiency, unless they are also accompanied by organizational and managerial changes.

There are 77 occupations that can be considered health care, as shown in appendix B. These health care occupations combined are projected to grow by 19.5 percent over the 2004 to 2014 time period, compared to 5.9 percent for non-health care occupations (7.3% for all occupations combined). Four health care occupations are among the fastest growing of all occupations: home health aides (45.0%), physician assistants (43.0%), medical assistants (42.2%) and diagnostic medical sonographers (31.0%).<sup>15</sup>

New job growth is one component of occupational demand, but another source of job openings is net replacement needs. On average there will be 22,176 annual openings for health care occupations in Ohio through 2014.<sup>16</sup> Of these, 11,505 openings will be from growth and 10,671 will be from the need to replace people currently in these occupations. Even in many of low-growth health care occupations there will be a need to replace people. For example, for dispensing opticians in Ohio there will be 15 annual openings due to growth through 2014, but 68 annual openings due to replace needs.

Both growth and replacement come into play when discussing the aging of the Ohio labor force. There is a need for more people, both skilled and unskilled, to take care of an aging population and a need to replace health care workers when they retire. The 2000 census was studied from the perspective of which occupations have a high proportion of individuals in the 44-to-55 age group. There are five health care occupations where more than 25 percent of the occupation was in this age group in 2000. These occupations are shown in Figure 9.

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<sup>14</sup> BLS, 2006 (pp. 119-120).

<sup>15</sup> ODJFS, 2006b.

<sup>16</sup> *Ibid.*

**Figure 9: Selected Occupations and Proportions 45 to 55, 2000**

Occupation	Percent 45 to 55
<b>Total, All Occupations, All Industries</b>	<b>22.7%</b>
Psychologists	42.8%
Medical & Health Service Managers	35.1%
Counselors	33.7%
Speech-Language Pathologists	33.7%
Licensed Practical & Licensed Vocational Nurses	30.9%
Registered Nurses	29.8%

Source: Goldstein, 2004. See technical notes for important details.

There are health care occupations and openings at every level of education or training. For example, home health aides and personal and home care aides require less than one month of training, dental hygienists and radiologic technicians require associate degrees, and physicians and surgeons need professional degrees. Figure 10 shows what the education and training needs are of all occupations. From this table, it can be seen that each year over one-quarter of the over 22,100 annual openings in health care occupations require less than a year of training. At the other end of the spectrum, there are 3,000 annual openings for health care jobs that require a master's degree or higher.

**Figure 10: Education and Training Need Summary**

Training/Education Level	Employment		2004-14 Change		Total Annual Openings
	2004	2014 Projected	Net	Percent	
<b>All Healthcare Occupations</b>	<b>591,340</b>	<b>706,390</b>	<b>115,050</b>	<b>19.5%</b>	<b>22,176</b>
Short-Term On-the-Job Training	81,540	105,780	24,240	29.7%	3,758
Moderate-Term On-the-Job Training	41,780	54,280	12,500	29.9%	2,048
Long-Term On-the-Job Training	5,960	6,290	330	5.5%	147
Postsecondary Vocational Award	167,530	188,280	20,750	12.4%	4,821
Associate Degree*	154,460	189,270	34,810	22.5%	6,616
Bachelor's Degree	39,050	44,910	5,860	15.0%	1,372
Work Experience plus a Bachelor's or Higher Degree	10,620	12,260	1,640	15.4%	371
Master's Degree	31,800	37,480	5,680	17.9%	1,150
Doctoral Degree	5,460	6,200	740	13.6%	193
First Professional Degree	52,370	60,860	8,490	16.2%	1,687

\*Registered Nurses are included in this category. Training requirements may be met through a two-year associate's degree, a three-year diploma, or a four-year bachelor's degree.

Source: ODJFS, 2006b.

This analysis focuses on occupations that had a 2004 employment of at least 5,000 and education and training requirements of not more than a bachelor's degree. Occupations that require only short-term on-the-job training and are easier to replace, such as home health aides, were also eliminated. The list of occupations was further narrowed by looking at the health care industries' staffing patterns (occupational employment distributions for an industry) and choosing only occupations that were in the top 10. For this report, only occupations that had the largest numbers of employees in ambulatory health care facilities, nursing and residential care facilities, and hospitals were included. By looking at employment size, education and training requirements, and staffing pattern data, the list was reduced to 12 occupations. These occupations are shown in Figure 11. This table also provides data on the number of total annual

openings for each of these occupations, as well as the number of apprenticeship programs currently in operation in Ohio.

**Figure 11: Selected High-Employment Health Care Occupations**

Title	2004 Empl.	Total Ann. Openings	Staffing Pattern Rank			Apprent. Progs.
			Ambul. Healthcare	Hospitals	Nursing Care	
Registered Nurses	107,010	4,630	2	1	4	**
Nursing Aides, Orderlies, and Attendants	76,600	1,994	21	2	1	11
Licensed Practical & Licensed Vocat. Nurses	37,690	1,204	8	3	2	**
Medical Secretaries	26,850	752	1	4	52	6
Medical Assistants	17,210	1,044	4	24	*	2
Dental Assistants	10,250	582	5	161	*	11
Emergency Medical Technicians & Paramedics	10,200	301	10	37	*	1
Radiologic Technologists and Technicians	9,620	394	24	6	*	0
Medical Records & Health Info. Technicians	6,530	227	29	16	26	0
Medical and Clinical Laboratory Technologists	6,200	275	41	8	*	**
Dental Hygienists	6,070	226	9	202	*	**
Respiratory Therapists	5,320	278	67	9	67	**

\*Not included in the staffing pattern

\*\*Not an apprenticeable occupation

Source: ODJFS, 2006b; 2007c.

When discussing the education and training requirements of health care occupations, registered nurses are difficult to analyze because their training can be met through a two-year associate's degree, a three-year diploma, or a bachelor's degree. According to the 2004 National Sample Survey of Registered Nurses, about half (51.2%) received their training from either a two-year associate degree or a three-year diploma.<sup>17</sup> Even without considering registered nurses, most health care workers have jobs that require less than a bachelor's degree.

The biggest employment challenge will be ensuring an adequate supply of registered nurses. This is the largest health care occupation, accounting for almost one out of every six health care jobs,<sup>18</sup> as well as a fast-growing occupation with a high number of annual openings. In addition, 30 percent of registered nurses are nearing retirement age. Compounding the issue, nursing schools cannot accommodate all applicants, primarily because of a faculty shortage.<sup>19</sup> The nurse educator workforce is aging and the salaries of these educators are considerably lower than if they were to work in hospitals.<sup>20</sup> In evaluating the supply and demand forces affecting labor markets for RNs, particularly upward pressure on wage rates, both the national and state levels project labor shortages for the immediate future.<sup>21</sup>

LPNs in Ohio, on the other hand, are likely to experience a competitive labor market with more job seekers competing for fewer openings. In recent years, the educational infrastructure for LPN training has been built up to the point where this single source of LPN labor supply now produces training program graduates almost 300 percent greater than the projected total annual openings for LPNs in Ohio. LPN training produced 3,510 graduates in FY 2006 to fill about

<sup>17</sup> U.S. Department of Health & Human Services, 2004.

<sup>18</sup> ODJFS, 2006b.

<sup>19</sup> American Association of Colleges of Nursing, 2005.

<sup>20</sup> ODJFS, *op. cit.*

<sup>21</sup> ODJFS, 2007b (pp. 6-12, 26-30, & 37-38).

1,200 projected annual openings from 2004 to 2014.<sup>22</sup> While not all LPN training program completers and license recipients will enter the labor market and seek LPN employment due to licensing difficulties, family responsibilities, health problems or other challenges, the large imbalance between the supply of LPN training program completers and demand implies a competitive labor market. Other sources of LPN labor supply, such as unemployed LPNs or occupational and geographic transfers, reinforce the conclusion of Ohio LPN labor surpluses.

Furthermore, LPN training output of new graduates is increasing rapidly: 49 percent from 2004 to 2006.<sup>23</sup> These rapid increases were reflected in the accompanying increases in newly-issued LPN licenses in Ohio. The Ohio Nursing Board issued 3,436 new LPN licenses by examination in FY 2006, an increase of 32 percent over 2004.<sup>24</sup>

The labor market conditions for the remaining ten selected occupations lie between the extremes of the RN and LPN labor markets. In general, the BLS has described the job outlook for these other occupations in positive terms. They noted that employment growth for medical secretaries would be above average and described the job outlook for emergency medical technicians and paramedics and for radiologic technologists and technicians as favorable, meaning a rough balance between the number of job openings and applicants is expected. The BLS described the job outlook for the remaining occupations as excellent or very good, meaning they expect more job openings than applicants. A recent study found that online job postings for technical health care occupations far outnumbered online postings of resumes for the same positions, indicating high demand.<sup>25</sup>

Ohio projections for job growth by 2014 for these occupations are above the state average of 7.3 percent.<sup>26</sup> The lowest projected job growth was for medical secretaries at 8.9 percent, and the highest was for medical assistants at 42.2 percent. The statewide growth in wages from 2002 to 2006 presents a somewhat different picture. Wages for radiological technologists and technicians grew 24.7 percent, which was much larger than the Consumer Price Index (CPI) increase of about 0.3 percent in Ohio. Wages for medical records and health information technicians grew 17.0 percent during the same period. The large wage increases could indicate skill shortages for these occupations. Wages for nursing aides, orderlies, and attendants; medical assistants; and emergency medical technicians and paramedics all rose more slowly than the CPI. Wages for medical secretaries, dental assistants, medical and clinical laboratory technologists, dental hygienists, and respiratory therapists increased as fast as or somewhat faster than the CPI. The next section examines the infrastructure that supplies formally trained workers for these occupations.

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<sup>22</sup> *Ibid* (p. 12). This total excludes baccalaureate graduates, who are more mobile and may compete in labor markets outside of the area in which they trained.

<sup>23</sup> *Ibid*.

<sup>24</sup> *Ibid*.

<sup>25</sup> ODJFS, 2006a.

<sup>26</sup> ODJFS, 2006b.



## IV. Education & Training Infrastructure

Training requirements in our 12 key health care occupations may be met in one of two ways: degree or certificate attainment at postsecondary institutions or apprenticeship programs. Only five of the 12 key occupations have apprenticeship programs in Ohio. An additional two are apprenticeable occupations, but do not have active programs in the state. Currently, there are 31 apprenticeship programs in Ohio in key health care occupations. There are 11 programs each for nursing aides and dental assistants. The others are for medical secretaries, medical assistants, and emergency medical technicians. Almost all of these programs are located in Southwest Central Ohio, which includes the Dayton area.

Programs for any other apprenticeable occupations would only be on specific aspects of the occupation. For example, the “Medical Coder” program would fall under medical records and information technicians. For radiologic technologists and technicians there are five different apprenticeship options: Computer Tomography Technicians, Diagnostic Imaging Specialties, Magnetic Resonance Imaging Technicians, Mammography Technologists, and Tumor Registrars.

Although formal education or structured training is available for most healthcare occupations, not all occupations require state licensing or certification. For occupations that require state licensing or certification, the supply of program completers is crucial for determining the job opportunities in these occupations. The supply of education or training program completers may be less crucial in determining the job opportunities for occupations that do not require state licensing or certification. In order to compare an occupation with the common postsecondary programs that feed into the occupation, we compiled a list of training programs for each of the twelve key occupations in appendix C, using unit-of-analysis information from the Occupational Supply Demand System.<sup>27</sup>

In Ohio, RNs, LPNs, emergency medical technicians (EMTs), dental hygienists, and respiratory therapists are required to have a state license or certification. Ohio also has a program for state-tested nurse aides. The other occupations selected do not require Ohio licensure or certification. The total number of program completers at the bachelor’s level and below is shown in Figure 12 compared with projected average annual openings. Training program supply does not include degrees above the bachelor’s level for three reasons. First, for many occupations, especially registered nursing, only current incumbents attain master’s or higher degrees, usually to enter a specialty. In other words, those earning these higher degrees are already in the labor market. Second, high educational attainment usually means greater geographic mobility, so these degree holders may compete in a broader or national labor market area. Third, on a practical level, most publicly funded worker training programs are for a shorter period of time, and thus not sufficient to cover anything higher than an associate degree.

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<sup>27</sup> 2008.

**Figure 12: Demand/Training Supply Comparisons in Key Health Care Occupations**

Title	Avg. An. Openings 2004-14	Training Output 2005-06	Entering Labor Market	Difference	2006 Avg. Hr. Wage	Wage Growth 2002-06
Registered Nurses*	4,630	5,397	4,587	43	\$26.50	17.8%
Nursing Aides, Orderlies, and Attendants	1,994	1,113	946	1,048	\$10.98	10.4%
Licensed Practical & Licensed Vocat. Nurses	1,204	3,519	2,991	-1,787	\$18.08	13.7%
Medical Secretaries	752	825	701	51	\$12.82	11.8%
Medical Assistants	1,044	3,202	2,722	-1,678	\$12.09	8.9%
Dental Assistants	582	579	492	90	\$14.28	14.4%
Emergency Medical Technicians & Paramedics	301	682	580	-279	\$12.64	3.0%
Radiologic Technologists and Technicians	394	567	482	-88	\$21.93	24.7%
Medical Records & Health Info. Technicians	227	694	590	-363	\$14.25	17.0%
Medical and Clinical Laboratory Technologists	275	98	83	192	\$23.07	15.3%
Dental Hygienists	226	244	207	19	\$28.00	12.5%
Respiratory Therapists	278	265	225	53	\$21.67	15.2%

Entering Labor Market reflects that of those completing training programs, about 15 percent do not enter the occupational market. Please see the Technical Notes. Training Output includes completers through the Bachelor's level.

\*Training output only includes Registered Nurse Training (CIP 51.1601).

Source: ODJFS, 2006b; OSDS 2008; Ohio Board of Regents, 2007; BLS, 2007b.

Looking at training output, one must bear in mind that on average, about 15 percent of those completing training programs in health care occupations do not go on to enter their respective labor markets.<sup>28</sup> Individuals may have a variety of reasons for not entering the labor market, such as failure to pass licensing exams, health problems, or family obligations. This reduced supply is shown in the 'entering labor market' column and is used for direct comparison with the demand of annual openings.

Also note that any projected training shortage may only be temporary if the training requirements for an occupation are relatively low. For example, training for nursing aides, orderlies and attendants lasts for a month or two, leading to a postsecondary vocational award. Additionally, for occupations not requiring state licensure or certification, structured training programs may not be the only source of occupational supply. Still, this could be a significant barrier to entry in an occupation, especially if training options in an area are limited.

The purpose of Figure 12 is not to identify labor shortages or surpluses in the market. Rather, this table is intended to measure whether the current educational infrastructure meets market demand. That is, whether there is an *educational* shortage or surplus. One example of an occupation that does not appear to have sufficient educational programs is medical and clinical laboratory technologists. There is a difference of 192 fewer training program completers expected to enter the job market and projected average annual openings.

The comparisons of demand and training output in Figure 12 are not enough to determine a labor shortage or surplus. Determining the incidence of shortage or surplus of labor in a given occupation requires examination of several economic indicators. It is recommended that forecasts of labor shortages in any occupation be based on conclusions reached using the six

<sup>28</sup> Ohio Board of Regents, 2007.

different state and national planning models of (a) high employment prospect occupations, (b) the human resource accounting model statewide (of occupational employment projections, training, and licensing data), (c) occupational wage data over time, (d) hard-to-fill job order statistics from the Ohio Job Matching System, (e) America's Job Bank keyword analysis of occupational balances and imbalances, and (f) BLS analyses of occupational labor market opportunities and competition in the *Occupational Outlook Handbook* (OOH) and its supplement, *Occupational Projections and Training Data*.<sup>29</sup>

One indicator of labor shortage or surplus—growth in average wages—is shown alongside education in Figure 12. Comparing wage growth from 2002 to 2006 with inflation during the same period (about 12.1% for all national urban areas) can hint as to whether supply is keeping pace with demand. Wage growth for radiologic technicians and technologists (24.7%) and for RNs (17.8%) is significantly higher than inflation, suggesting a possible shortage for those occupations.

Finally, some imbalances in labor markets may occur for reasons such as a lack of occupational knowledge among workers or inadequate recruitment efforts among employers. For example, people unaware of certain occupational opportunities will not choose training programs leading to employment in those occupations.<sup>30</sup>

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<sup>29</sup> ODJFS, 2007b.

<sup>30</sup> Richardson, 2007.

## V. Regional Analysis

The Ohio Department of Development has divided the state into twelve Economic Development Regions (EDRs) for analytical and administrative purposes. A map of the EDRs and their names can be found in Appendix A. A brief comparison of the health care industry, its key occupations, and vital training programs in each of the EDRs follows.

Figure 13 below compares location quotients (LQs) for health care industries in each of the EDRs. A location quotient may be defined as an industry's proportion of total employment for a region as a ratio of its proportion of total employment nationally. An LQ greater than one indicates that industry employment is more concentrated in a region than nationally, while less than one means that it is less concentrated. LQs of 1.2 or more are highlighted in gray.

**Figure 13: Health Care Location Quotients**

Economic Development Region	Health Care & Social Assist.	Ambul. Health Care	Hospitals	Nursing & Res. Care
<b>Ohio Statewide</b>	1.1	1.0	1.2	<b>1.4</b>
<b>Central</b>	1.0	1.0	1.0	1.0
<b>Northwest</b>	<b>1.2</b>	1.2	<b>1.3</b>	<b>1.6</b>
<b>West Central</b>	1.1	0.9	1.1	<b>1.5</b>
<b>Southwest Central</b>	1.1	1.0	1.2	<b>1.4</b>
<b>Southwest</b>	1.1	1.1	1.1	<b>1.2</b>
<b>North Central</b>	1.1	1.0	0.9	<b>1.8</b>
<b>Southern</b>	<b>1.6</b>	<b>1.5</b>	<b>1.5</b>	<b>2.3</b>
<b>Northern</b>	<b>1.2</b>	1.0	<b>1.5</b>	<b>1.4</b>
<b>Northeast Central</b>	1.1	1.1	1.1	<b>1.4</b>
<b>East Central</b>	<b>1.3</b>	1.1	<b>1.2</b>	<b>2.0</b>
<b>Southeast</b>	<b>1.3</b>	<b>1.3</b>	0.9	<b>2.0</b>
<b>Northeast</b>	<b>1.3</b>	<b>1.4</b>	1.0	<b>1.9</b>

The table clearly indicates that across Ohio, employment in nursing and residential care is highly concentrated relative to the rest of the nation. In some regions, this industry's share of employment is more than twice as much as in the U.S. The only region that has a normal share of employment in this industry is Central Ohio, which includes most of the Columbus metropolitan area.

While location quotients are generally used to determine whether a region is host to an export industry, this measure does have some drawbacks, especially in regards to health care. For some areas, health care may comprise a large portion of employment if there is high local unemployment or if most of the economy relies on employment not covered by the Quarterly Census of Employment and Wages (QCEW). And because demand for health care services may be regarded as relatively inelastic as the economy grows and contracts, it may be expected to stick out more in an economically-ailing region. Thus, Northern Ohio's LQ of 1.5 for hospitals might reflect high employment at some nationally-recognized establishments, while the same hospital LQ in Southern Ohio (Chillicothe, Portsmouth and environs) may reflect the relative lack of employment in other covered industries.

Since we might expect demand for health care to stay constant relative to general economic conditions, we could use total population as a proxy for demand. A ratio of employment to population higher than the national ratio might indicate greater demand for services than would normally be supported by the local area—an export industry. (In any of these local/national comparison statistics, we are assuming constant labor productivity and constant patterns of consumption or general health.)

**Figure 14: Formula for Modified “Population Location Quotient”**

$$PLQ = \frac{E_r \times P_n}{E_n \times P_r}$$

A formula for this new measure—call it the population location quotient or PLQ—is shown above, where  $E_r$  is the industry’s regional employment,  $E_n$  is the industry’s national employment,  $P_r$  is regional population and  $P_n$  is national population. Results are shown in Figure 15 below. Within the hospital industry, Northern Ohio has the highest quotient, indicative of an export industry for this region. Other strong regions include Northwest Ohio (the Toledo area) and Southwest Ohio (the Cincinnati area). Interestingly, Central Ohio’s quotient is only slightly elevated. As with the regular LQ earlier, nursing and residential care is still very concentrated across Ohio.

**Figure 15: Modified Health Care Population Location Quotients**

Economic Development Region	Health Care & Social Assist.	Ambul. Health Care	Hospitals	Nursing & Res. Care
<b>Ohio Statewide</b>	1.2	1.1	1.2	1.4
<b>Central</b>	1.2	1.1	1.1	1.2
<b>Northwest</b>	1.3	1.2	1.3	1.7
<b>West Central</b>	1.1	0.9	1.1	1.5
<b>Southwest Central</b>	1.2	1.1	1.2	1.4
<b>Southwest</b>	1.2	1.2	1.2	1.4
<b>North Central</b>	0.9	0.8	0.8	1.5
<b>Southern</b>	1.0	1.0	0.9	1.5
<b>Northern</b>	1.4	1.1	1.7	1.5
<b>Northeast Central</b>	1.1	1.1	1.1	1.4
<b>East Central</b>	1.0	0.9	1.0	1.6
<b>Southeast</b>	0.8	0.8	0.6	1.3
<b>Northeast</b>	1.1	1.2	0.9	1.7

Figure 10 earlier in this report had identified 12 occupations key to the health care industry: RNs; nursing aides and orderlies; LPNs; medical secretaries; medical assistants; dental assistants; EMTs; radiologic techs; medical record techs; medical and clinical laboratory techs; dental hygienists; and respiratory therapists. Appendix D at the end of this report lists employment projections and current wages for each of these occupations in each of the Economic Development Regions.

Figure 16 compares the relative ranks of average hourly wages for each of the occupations. In most of these regions, the top three occupations are dental hygienists, registered nurses, and medical and clinical lab technologists, with hygienists or RNs usually having the highest wages.

There is not much variation in rankings between regions, with those occupations requiring more education and training generally commanding higher wages. Bear in mind that wage data are not available for all areas and all occupations; if wage data are suppressed in certain regions, ranks for other occupations may be artificially high.

**Figure 16: Relative Ranks of 2006 Average Hourly Wages by EDR, Selected Occupations**

	Ohio	EDR 1	EDR 2	EDR 3	EDR 4	EDR 5	EDR 6	EDR 7	EDR 8	EDR 9	EDR 10	EDR 11	EDR 12
Dent. Hyg.	1	1	1		1	1		3		1	1		2
RNs	2	2	2	1	2	2	1	1	1	2	2	1	1
Lab Techs	3	3	3	2	3	3	2	2		3			
Resp. Ther.	4	4	5		5	4	4			4			3
Rad. Techs	5		4		4	5	3	4		5			4
LPNs	6	5	6	3	6	6	5	5	2	6	3	2	5
Dent. Assts.	7	6	9			8	7	6	5				8
Med. Rec. Techs	8	9	7		7	9	6		3	9	4	3	6
EMTs	9	7	11		8	7	8			7			7
Med. Secs.	10	8	8	4	9	11	11	7	4	8	5	4	10
Med. Assts.	11	10	10		10	10	9	9	6	10	6	5	9
Nurs. Aides	12	11	12	5	11	12	10	8		11	7	6	11

Figure 17 shows similar rankings for projected average annual openings from 2004 to 2014. Across all regions, registered nursing will have the strongest job openings, followed by nursing aides and licensed practical nurses. Again, there is little variation between regions in the relative ranks of annual openings. And like before, suppression in certain occupations may lead to artificially high rankings.

**Figure 17: Relative Ranks of Projected 2004-14 Average Annual Openings by EDR, Selected Occupations**

	Ohio	EDR 1	EDR 2	EDR 3	EDR 4	EDR 5	EDR 6	EDR 7	EDR 8	EDR 9	EDR 10	EDR 11	EDR 12
RNs	1	1	1	1	1	1	1	1	1	1	1	1	1
Nurs. Aides	2	2	2	2	2	2	2	2	2	2	2	2	2
LPNs	3	4	3	3	3	4	3	3	3	3	3	3	3
Med. Assts.	4	3	4	5	4	3	4	4	4	4	4	4	4
Med. Secs.	5	5	5	4	5	6	5	5	5	5	5	5	5
Dent. Assts.	6	6	6	6	6	5	6	6	6	6	6		6
Rad. Techs	7	7	9	8	7	7	8	8	7	8	7		7
EMTs	8	9	8	11	10	8	7		10	7			9
Resp. Ther.	9	11	7	7	9	12	9		9	9	8		10
Lab Techs	10	10	11	8	8	9	11	9	8	12	11		
Med. Rec. Techs	11	12	9	11	12	11	12		11	10	9	6	11
Dent. Hyg.	12	8	12	10	11	10	10	7	12	10	10		8

## **VI. Conclusions**

The health care industries present exciting opportunities and challenges for workforce development in Ohio. Historically, health care industries have been relatively immune to fluctuations in the business cycle. Employment in health care industries has increased almost linearly since the mid-1970s and is expected to continue growing strongly because of an aging population. Not all health care industries and occupations share the same employment outlook.

The hospital industry tends to have a relatively small number of establishments with a large number of employees, and the ambulatory health care services and the nursing and residential care facilities industries tend to have more numerous establishments with fewer employees. Health care occupations can be high-skill, high-wage occupations or low-skill, low-wage occupations. The key for workforce development will be to see to it that there is an adequate supply of workers for the high-skill occupations.

As a group, employment in 77 different health care occupations is expected to grow by 19.5 percent between 2004 and 2014. Most of these occupations are expected to grow faster than the statewide average for all occupations, 7.3 percent. High job growth and occupational demand also carries the potential for shortages where the educational infrastructure cannot keep pace with demand. The classic example is the labor market for registered nurses. Demand for highly skilled registered nurses is increasing, and the average educational attainment of registered nurses will probably increase.

In addition to employment growth, the health care industries will also face an increasing need to replace retiring workers. Many health care occupations have a high proportion of workers ages 45 to 55. Employers and educators should anticipate potential losses of crucial health care workers due to retirements and plan accordingly.

High-skill occupations tend to rely on structured training or educational programs for a supply of workers. The educational infrastructure of an occupation can affect its labor market. For example, the current educational infrastructure may not be able to produce enough RNs in the future because of faculty shortages. Education for registered nurses will need to consider both future job demand and the education infrastructure. Other high-skill health care occupations may need to make similar considerations. Planners should also be concerned about the potential for over production, which appears to be the current situation for Licensed Practical Nurses. Over production will create a competitive labor market among program completers and could depress wages.

Another challenge for workforce development in Ohio will be the geographic distribution of both the need for health care workers and the training and education of those workers. The distribution of the educational training opportunities across the state may not always be aligned with the demand for health care workers.

## Technical Notes

Industrial employment and wage data in this report are from the Quarterly Census of Employment and Wages (QCEW). These data are compiled using unemployment compensation tax returns and administrative data. As a result, business establishments not covered by Ohio unemployment compensation law are not counted. Most health care business establishments are covered and are thus included.

All industries in this report were classified using the North American Industrial Classification System (NAICS) 2002 edition, developed in part by the U.S. Office of Management and Budget. NAICS assigns each industry a 2- to 6-digit code, with longer codes assigned to more detailed industries. For more details on NAICS and a complete listing of industries and codes, please visit <http://www.census.gov/epcd/www/naics.html>.

Occupational employment and average wage data in this report are from the Occupational Employment Statistics (OES) program. These survey estimates are compiled through voluntary questionnaires sent to business establishments around the state on a three-year cycle. Not all OES data are comparable over time, especially if major changes have been made to the series. Given the limited scope of this project, however, we believe we can make reasonable longitudinal comparisons of the data, specifically average hourly wages. Point estimates at the state level have low relative standard errors, indicating a high degree of accuracy for each year. Plus, year-to-year stability of these estimates suggests the health care data have been affected less by classification changes than in other industries.

Occupations in this report were largely classified using Standard Occupational Classifications (SOC). Like NAICS, SOC uses a set of 2- to 6-digit codes to classify standardized occupations, with longer codes going to more detailed occupations. For details on SOC, please visit <http://www.bls.gov/soc/home.htm>.

The occupational aging data shown in Figure 9 were developed as part of a study of occupational replacement rates by the State Projections Workgroup and were derived from the 2000 Decennial Census. The complete set of data is available from ODJFS upon request. These data were originally classified using the Census 2000 Equal Employment Opportunity (EEO) tabulations. EEO and SOC are slightly different and have some inconsistencies. These classifications were converted before analysis. For details on Census classifications, visit <http://www.census.gov/hhes/www/index/view.html>.

Data on educational program completions are from the Integrated Postsecondary Education Data System (IPEDS) from the U.S. Department of Education. To log on to the IPEDS system and download data, visit <http://nces.ed.gov/ipeds/pas/>. Instructional programs were classified using Classifications of Instructional Programs (CIP). Again, CIP uses a set of 2- to 6-digit codes to classify standardized educational programs. For details, visit <http://nces.ed.gov/pubs2002/cip2000/>.



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## Appendix B: Health Care-Related Occupational Projections by Training Needs

Code	Occupational Title	Employment		Change 2004-14		Avg. An. Openings	Avg. Hr. Wages 2007*
		2004	2014 Projected	Net	Percent		
<b>Occupations Requiring Short-Term On-the-Job Training (up to one month)</b>							
		<b>81,540</b>	<b>105,780</b>	<b>24,240</b>	<b>29.7%</b>	<b>3,758</b>	<b>NA</b>
31-1011	Home Health Aides	33,970	49,250	15,280	45.0%	1,973	\$9.70
31-1013	Psychiatric Aides	1,060	1,180	120	11.3%	26	\$10.74
31-2012	Occupational Therapist Aides	110	130	20	18.2%	3	\$12.98
31-2022	Physical Therapist Aides	1,230	1,480	250	20.3%	46	\$11.56
31-9093	Medical Equipment Preparers	2,080	2,370	290	13.9%	67	\$12.97
31-9095	Pharmacy Aides	2,220	2,470	250	11.3%	66	\$9.85
31-9096	Vet. Assistants & Laboratory Animal Caretakers	3,790	4,340	550	14.5%	125	\$10.42
39-9021	Personal and Home Care Aides	20,300	25,020	4,720	23.3%	797	\$9.20
43-4111	Interviewers, except Eligibility and Loan	9,370	11,040	1,670	17.8%	409	\$13.16
<b>Occupations Requiring Moderate-Term On-the-Job Training (one to twelve months combined experience/training)</b>							
		<b>41,780</b>	<b>54,280</b>	<b>12,500</b>	<b>29.9%</b>	<b>2,048</b>	<b>NA</b>
29-2051	Dietetic Technicians	620	710	90	14.5%	17	\$15.81
29-2052	Pharmacy Technicians	9,970	11,820	1,850	18.6%	315	\$12.19
29-2053	Psychiatric Technicians	1,890	1,940	50	2.6%	30	\$15.48
31-9091	Dental Assistants	10,250	13,200	2,950	28.8%	582	\$14.75
31-9092	Medical Assistants	17,210	24,470	7,260	42.2%	1,044	\$12.48
39-9041	Residential Advisors	1,050	1,240	190	18.1%	41	\$13.10
53-3011	Ambulance Drivers & Attendants, except EMT	790	900	110	13.9%	19	\$8.72
<b>Occupations Requiring Long-Term On-the-Job Training (twelve months or more combined experience/training)</b>							
		<b>5,960</b>	<b>6,290</b>	<b>330</b>	<b>5.5%</b>	<b>147</b>	<b>NA</b>
29-2081	Opticians, Dispensing	3,870	4,020	150	3.9%	83	\$15.27
51-9081	Dental Laboratory Technicians	2,090	2,270	180	8.6%	64	\$17.11
<b>Occupations Requiring Postsecondary Vocational Award</b>							
		<b>167,530</b>	<b>188,280</b>	<b>20,750</b>	<b>12.4%</b>	<b>4,821</b>	<b>NA</b>
29-2041	Emergency Medical Technicians & Paramedics	10,200	12,040	1,840	18.0%	301	\$13.04
29-2055	Surgical Technologists	2,650	3,210	560	21.1%	91	\$17.25
29-2061	Licensed Practical & Licensed Vocat. Nurses	37,690	41,510	3,820	10.1%	1,204	\$18.67
29-9012	Occupational Health and Safety Technicians	590	620	30	5.1%	16	\$22.69
31-1012	Nursing Aides, Orderlies, and Attendants	76,600	86,500	9,900	12.9%	1,994	\$11.34
31-9011	Massage Therapists	3,780	4,350	570	15.1%	130	\$22.47
31-9094	Medical Transcriptionists	4,430	5,320	890	20.1%	171	\$14.32
43-6013	Medical Secretaries	26,850	29,230	2,380	8.9%	752	\$13.15
<b>Occupations Requiring an Associate Degree</b>							
		<b>154,460</b>	<b>189,270</b>	<b>34,810</b>	<b>22.5%</b>	<b>6,616</b>	<b>NA</b>
29-1111	Registered Nurses	107,010	130,920	23,910	22.3%	4,630	\$27.36
29-1124	Radiation Therapists	590	700	110	18.6%	24	\$30.09
29-1126	Respiratory Therapists	5,320	6,350	1,030	19.4%	278	\$22.37
29-2012	Medical and Clinical Laboratory Technicians	5,080	6,120	1,040	20.5%	241	\$16.71
29-2021	Dental Hygienists	6,070	7,810	1,740	28.7%	226	\$28.91
29-2031	Cardiovascular Technologists and Technicians	1,650	1,960	310	18.8%	62	\$21.32
29-2032	Diagnostic Medical Sonographers	1,840	2,410	570	31.0%	91	\$28.06
29-2033	Nuclear Medicine Technologists	820	990	170	20.7%	32	\$29.40
29-2034	Radiologic Technologists and Technicians	9,620	11,760	2,140	22.2%	394	\$22.64
29-2054	Respiratory Therapy Technicians	580	600	20	3.4%	10	\$18.23

Code	Occupational Title	Employment		Change 2004-14		Avg. An. Openings	Avg. Hr. Wages 2007*
		2004	2014 Projected	Net	Percent		
<b>Occupations Requiring an Associate Degree [con't]</b>		<b>154,460</b>	<b>189,270</b>	<b>34,810</b>	<b>22.5%</b>	<b>6,616</b>	<b>NA</b>
29-2056	Veterinary Technologists and Technicians	1,650	2,100	450	27.3%	67	\$14.10
29-2071	Medical Records & Health Info. Technicians	6,530	7,860	1,330	20.4%	227	\$14.71
31-2011	Occupational Therapist Assistants	2,010	2,560	550	27.4%	81	\$21.93
31-2021	Physical Therapist Assistants	4,430	5,770	1,340	30.2%	208	\$21.28
49-9062	Medical Equipment Repairers	1,260	1,360	100	7.9%	45	\$22.43
<b>Occupations Requiring a Bachelor's Degree</b>		<b>39,050</b>	<b>44,910</b>	<b>5,860</b>	<b>15.0%</b>	<b>1,372</b>	<b>NA</b>
17-2031	Biomedical Engineers	230	290	60	26.1%	10	\$33.02
21-1021	Child, Family and School Social Workers	11,020	12,480	1,460	13.2%	335	\$17.59
21-1022	Medical and Public Health Social Workers	6,320	7,370	1,050	16.6%	213	\$20.44
29-1031	Dietitians and Nutritionists	2,490	2,760	270	10.8%	92	\$23.74
29-1071	Physician Assistants	2,140	3,060	920	43.0%	125	\$36.85
29-1125	Recreational Therapists	1,070	1,080	10	0.9%	27	\$19.29
29-2011	Medical and Clinical Laboratory Technologists	6,200	7,280	1,080	17.4%	275	\$23.82
29-2091	Orthotists and Prosthetists	190	210	20	10.5%	5	\$28.10
29-9011	Occupational Health and Safety Specialists	1,840	1,990	150	8.2%	55	\$32.80
29-9091	Athletic Trainers	840	1,070	230	27.4%	41	\$42,581**
<b>Occupations Requiring Work Experience plus a Bachelor's or Higher Degree</b>							
11-9111	Medical and Health Services Managers	10,620	12,260	1,640	15.4%	371	\$36.35
<b>Occupations Requiring a Master's Degree</b>		<b>31,800</b>	<b>37,480</b>	<b>5,680</b>	<b>17.9%</b>	<b>1,150</b>	<b>NA</b>
19-3032	Industrial-Organizational Psychologists	120	140	20	16.7%	5	\$34.86
21-1011	Substance Abuse & Behavioral Dis. Counselors	2,150	2,580	430	20.0%	92	\$18.06
21-1013	Marriage and Family Therapists	360	410	50	13.9%	13	\$24.24
21-1014	Mental Health Counselors	3,010	3,600	590	19.6%	128	\$19.84
21-1015	Rehabilitation Counselors	3,720	4,140	420	11.3%	127	\$20.45
21-1023	Mental Health & Substance Abuse Social Work.	6,120	7,560	1,440	23.5%	249	\$17.94
21-1091	Health Educators	1,600	1,890	290	18.1%	57	\$21.02
29-1122	Occupational Therapists	3,730	4,580	850	22.8%	135	\$32.42
29-1123	Physical Therapists	5,780	7,040	1,260	21.8%	183	\$33.70
29-1127	Speech-Language Pathologists	4,880	5,200	320	6.6%	153	\$33.02
<b>Occupations Requiring a Doctoral Degree</b>							
19-3031	Clinical, Counseling and School Psychologists	5,460	6,200	740	13.6%	193	\$37.46
<b>Occupations Requiring a First Professional Degree</b>		<b>52,370</b>	<b>60,860</b>	<b>8,490</b>	<b>16.2%</b>	<b>1,687</b>	<b>NA</b>
29-1011	Chiropractors	1,880	2,020	140	7.4%	50	\$50.59
29-1021	Dentists, General	4,300	4,450	150	3.5%	87	\$82.15
29-1041	Optometrists	1,450	1,540	90	6.2%	49	\$54.29
29-1051	Pharmacists	9,580	11,360	1,780	18.6%	364	\$45.02
29-1061	Anesthesiologists	1,180	1,420	240	20.3%	40	\$93.97
29-1062	Family and General Practitioners	5,750	6,850	1,100	19.1%	187	\$77.79
29-1063	Internists, General	3,230	3,900	670	20.7%	110	\$76.02
29-1064	Obstetricians and Gynecologists	1,140	1,370	230	20.2%	38	\$83.20
29-1065	Pediatricians, General	2,910	3,470	560	19.2%	95	\$74.06
29-1066	Psychiatrists	830	970	140	16.9%	25	\$73.63
29-1067	Surgeons	2,050	2,480	430	21.0%	70	\$93.41
29-1081	Podiatrists	560	600	40	7.1%	18	\$51.47
29-1121	Audiologists	420	430	10	2.4%	11	\$27.56
29-1131	Veterinarians	2,240	2,520	280	12.5%	82	\$41.93

\*Occupations with 100 workers or more.

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

Source: ODJFS, 2006b.

## Appendix C: Training Programs for Crucial Health Care Occupations

### Registered Nurses (29-1111)

- 51.1601 Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)
- 51.1603 Adult Health Nurse/Nursing
- 51.1604 Nurse Anesthetist
- 51.1605 Family Practice Nurse/Nurse Practitioner
- 51.1606 Maternal/Child Health and Neonatal Nurse/Nursing
- 51.1607 Nurse Midwife/Nursing Midwifery
- 51.1608 Nursing Science (MS, PhD)
- 51.1609 Pediatric Nurse/Nursing
- 51.1610 Psychiatric/Mental Health Nurse/Nursing
- 51.1611 Public Health/Community Nurse/Nursing
- 51.1612 Perioperative/Operating Room and Surgical Nurse/Nursing
- 51.1616 Clinical Nurse Specialist
- 51.1699 Nursing, Other

### Nursing Aides, Orderlies, and Attendants (31-1012)

- 51.1614 Nurse/Nursing Assistant/Aide and Patient Care Assistant

### Licensed Practical and Licensed Vocational Nurses (29-2061)

- 51.1613 Licensed Practical /Vocational Nurse Training (LPN, LVN, Cert, Dipl, AAS)

### Medical Secretaries (43-6013)

- 51.0710 Medical Office Assistant/Specialist
- 51.0712 Medical Reception/Receptionist
- 51.0714 Medical Insurance Specialist/Medical Biller
- 51.0715 Health/Medical Claims Examiner
- 51.0716 Medical Administrative/Executive Assistant and Medical Secretary

### Medical Assistants (31-9092)

- 51.0711 Medical/Health Management and Clinical Assistant/Specialist
- 51.0801 Medical/Clinical Assistant
- 51.0811 Pathology/Pathologist Assistant
- 51.0813 Chiropractic Assistant/Technician
- 51.0899 Allied Health and Medical Assisting Services, Other
- 51.1803 Ophthalmic Technician/Technologist
- 51.1804 Orthoptics/Orthoptist
- 51.1899 Ophthalmic and Optometric Support Services and Allied Professions, Other

### Dental Assistants (31-9091)

- 51.0601 Dental Assisting/Assistant

### Emergency Medical Technicians and Paramedics (29-2041)

- 51.0810 Emergency Care Attendant (EMT Ambulance)
- 51.0904 Emergency Medical Technology/Technician (EMT Paramedic)

### Radiologic Technologists and Technicians (29-2034)

- 51.0907 Medical Radiologic Technology/Science - Radiation Therapist
- 51.0911 Radiologic Technology/Science - Radiographer

### Medical Records and Health Information Technicians (29-2071)

- 51.0707 Health Information/Medical Records Technology/Technician
- 51.0713 Medical Insurance Coding Specialist/Coder

**Medical and Clinical Laboratory Technologists (29-2011)**

- 51.1001 Blood Bank Technology Specialist
- 51.1002 Cytotechnology/Cytotechnologist
- 51.1003 Hematology Technology/Technician
- 51.1004 Clinical/Medical Laboratory Technician
- 51.1005 Clinical Laboratory Science/Medical Technology/Technologist
- 51.1007 Histologic Technology/Histotechnologist
- 51.1008 Histologic Technician
- 51.1010 Cytogenetics/Genetics/Clinical Genetics Technology/Technologist
- 51.1011 Renal/Dialysis Technologist/Technician
- 51.1099 Clinical/Medical Laboratory Science and Allied Professions, Other

**Dental Hygienists (29-2021)**

- 51.0602 Dental Hygiene/Hygienist

**Respiratory Therapists (29-1126)**

- 51.0908 Respiratory Care Therapy/Therapist

Source: OSDS, 2008.

## Appendix D: Employment Projections & Wages by Economic Development Region, Selected Occupations

### EDR 1: Central Ohio

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>48,680</b>	<b>57,510</b>	<b>8,830</b>	<b>18.1%</b>	<b>1,790</b>	<b>\$32.58</b>	
29-1111	Registered Nurses	16,340	19,620	3,280	20.1%	670	\$27.16	2
29-1126	Respiratory Therapists	810	970	160	19.8%	43	\$21.85	4
29-2011	Medical and Clinical Laboratory Technologists	1,030	1,220	190	18.4%	47	\$22.65	3
29-2021	Dental Hygienists	1,330	1,780	450	33.8%	57	\$28.08	1
29-2034	Radiologic Technologists and Technicians	1,470	1,800	330	22.4%	60	NA	
29-2041	Emergency Medical Technicians & Paramedics	2,360	2,610	250	10.6%	52	\$14.24	7
29-2061	Licensed Practical & Licensed Vocat. Nurses	4,540	4,840	300	6.6%	129	\$19.69	5
29-2071	Medical Records & Health Info. Technicians	1,070	1,280	210	19.6%	35	\$14.07	9
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>25,530</b>	<b>32,200</b>	<b>6,670</b>	<b>26.1%</b>	<b>1,059</b>	<b>\$12.02</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	10,050	10,900	850	8.5%	218	\$11.44	11
31-9091	Dental Assistants	1,400	1,880	480	34.3%	87	\$15.82	6
31-9092	Medical Assistants	3,120	4,480	1,360	43.6%	194	\$12.81	10
43-6013	Medical Secretaries	3,980	4,420	440	11.1%	120	\$14.08	8

### EDR 2: Northwest Ohio

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>27,050</b>	<b>32,650</b>	<b>5,600</b>	<b>20.7%</b>	<b>1,080</b>	<b>\$29.10</b>	
29-1111	Registered Nurses	9,550	11,850	2,300	24.1%	430	\$25.88	2
29-1126	Respiratory Therapists	700	880	180	25.7%	41	\$21.63	5
29-2011	Medical and Clinical Laboratory Technologists	640	730	90	14.1%	26	\$24.42	3
29-2021	Dental Hygienists	510	720	210	41.2%	25	\$26.66	1
29-2034	Radiologic Technologists and Technicians	790	960	170	21.5%	32	\$22.08	4
29-2041	Emergency Medical Technicians & Paramedics	1,160	1,400	240	20.7%	37	\$12.42	11
29-2061	Licensed Practical & Licensed Vocat. Nurses	3,380	3,710	330	9.8%	107	\$18.22	6
29-2071	Medical Records & Health Info. Technicians	860	1,060	200	23.3%	32	\$14.26	7
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>16,090</b>	<b>20,890</b>	<b>4,800</b>	<b>29.8%</b>	<b>730</b>	<b>\$11.86</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	7,010	8,050	1,040	14.8%	196	\$10.82	12
31-9091	Dental Assistants	950	1,340	390	41.1%	65	\$13.18	9
31-9092	Medical Assistants	1,580	2,340	760	48.1%	105	\$12.62	10
43-6013	Medical Secretaries	1,970	2,250	280	14.2%	66	\$13.33	8

### EDR 3: West Central Ohio

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>8,770</b>	<b>10,490</b>	<b>1,720</b>	<b>19.6%</b>	<b>343</b>	<b>\$25.85</b>	
29-1111	Registered Nurses	3,450	4,310	860	24.9%	158	\$24.34	1
29-1126	Respiratory Therapists	210	250	40	19.0%	11	NA	
29-2011	Medical and Clinical Laboratory Technologists	180	230	50	27.8%	10	\$21.17	2
29-2021	Dental Hygienists	260	330	70	26.9%	9	NA	
29-2034	Radiologic Technologists and Technicians	280	330	50	17.9%	10	NA	
29-2041	Emergency Medical Technicians & Paramedics	150	180	30	20.0%	5	NA	
29-2061	Licensed Practical & Licensed Vocat. Nurses	1,140	1,210	70	6.1%	32	\$17.13	3
29-2071	Medical Records & Health Info. Technicians	180	200	20	11.1%	5	NA	
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>5,640</b>	<b>7,140</b>	<b>1,500</b>	<b>26.6%</b>	<b>235</b>	<b>\$10.56</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	2,560	2,880	320	12.5%	66	\$10.19	5
31-9091	Dental Assistants	310	410	100	32.3%	19	NA	
31-9092	Medical Assistants	350	500	150	42.9%	21	NA	
43-6013	Medical Secretaries	1,010	1,110	100	9.9%	29	\$13.21	4



**EDR 4: Southwest Central Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>29,770</b>	<b>35,160</b>	<b>5,390</b>	<b>18.1%</b>	<b>1,111</b>	<b>\$29.80</b>	
29-1111	Registered Nurses	10,720	13,140	2,420	22.6%	466	\$25.30	2
29-1126	Respiratory Therapists	520	630	110	21.2%	28	\$21.55	5
29-2011	Medical and Clinical Laboratory Technologists	600	730	130	21.7%	29	\$22.87	3
29-2021	Dental Hygienists	570	750	180	31.6%	23	\$28.91	1
29-2034	Radiologic Technologists and Technicians	1,020	1,200	180	17.6%	37	\$21.59	4
29-2041	Emergency Medical Technicians & Paramedics	900	1,050	150	16.7%	25	\$13.63	8
29-2061	Licensed Practical & Licensed Vocat. Nurses	3,870	4,350	480	12.4%	133	\$18.12	6
29-2071	Medical Records & Health Info. Technicians	620	720	100	16.1%	19	\$13.68	7
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>16,980</b>	<b>20,890</b>	<b>3,910</b>	<b>23.0%</b>	<b>651</b>	<b>\$11.70</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	8,690	9,820	1,130	13.0%	227	\$11.24	11
31-9091	Dental Assistants	990	1,310	320	32.3%	60	NA	
31-9092	Medical Assistants	1,560	2,240	680	43.6%	97	\$12.07	10
43-6013	Medical Secretaries	3,220	3,560	340	10.6%	96	\$12.53	9

**EDR 5: Southwest Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>47,010</b>	<b>57,410</b>	<b>10,400</b>	<b>22.1%</b>	<b>1,924</b>	<b>\$30.62</b>	
29-1111	Registered Nurses	16,390	20,740	4,350	26.5%	778	\$27.64	2
29-1126	Respiratory Therapists	760	930	170	22.4%	42	\$22.09	4
29-2011	Medical and Clinical Laboratory Technologists	1,000	1,230	230	23.0%	50	\$23.79	3
29-2021	Dental Hygienists	1,030	1,390	360	35.0%	45	\$30.85	1
29-2034	Radiologic Technologists and Technicians	1,390	1,720	330	23.7%	59	\$21.86	5
29-2041	Emergency Medical Technicians & Paramedics	1,760	2,140	380	21.6%	58	\$15.60	7
29-2061	Licensed Practical & Licensed Vocat. Nurses	4,730	5,200	470	9.9%	150	\$19.38	6
29-2071	Medical Records & Health Info. Technicians	1,060	1,340	280	26.4%	43	\$14.58	9
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>22,380</b>	<b>28,750</b>	<b>6,370</b>	<b>28.5%</b>	<b>991</b>	<b>\$12.61</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	9,530	10,580	1,050	11.0%	230	\$11.79	12
31-9091	Dental Assistants	1,720	2,320	600	34.9%	108	\$15.17	8
31-9092	Medical Assistants	2,840	4,240	1,400	49.3%	193	\$12.93	10
43-6013	Medical Secretaries	2,190	2,480	290	13.2%	71	\$12.56	11

**EDR 6: North Central Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>9,510</b>	<b>10,860</b>	<b>1,350</b>	<b>14.2%</b>	<b>317</b>	<b>\$24.92</b>	
29-1111	Registered Nurses	3,050	3,590	540	17.7%	118	\$25.03	1
29-1126	Respiratory Therapists	180	220	40	22.2%	10	\$20.63	4
29-2011	Medical and Clinical Laboratory Technologists	140	160	20	14.3%	6	\$23.08	2
29-2021	Dental Hygienists	240	300	60	25.0%	8	NA	
29-2034	Radiologic Technologists and Technicians	300	350	50	16.7%	11	\$21.16	3
29-2041	Emergency Medical Technicians & Paramedics	340	420	80	23.5%	12	\$11.69	8
29-2061	Licensed Practical & Licensed Vocat. Nurses	1,830	1,870	40	2.2%	44	\$16.45	5
29-2071	Medical Records & Health Info. Technicians	240	260	20	8.3%	5	\$12.55	6
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>6,880</b>	<b>8,210</b>	<b>1,330</b>	<b>19.3%</b>	<b>236</b>	<b>\$10.94</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	3,330	3,440	110	3.3%	55	\$10.91	10
31-9091	Dental Assistants	290	360	70	24.1%	15	\$11.71	7
31-9092	Medical Assistants	570	780	210	36.8%	32	\$11.51	9
43-6013	Medical Secretaries	1,170	1,240	70	6.0%	29	\$10.56	11

**EDR 7: Southern Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>8,850</b>	<b>10,180</b>	<b>1,330</b>	<b>15.0%</b>	<b>298</b>	<b>\$24.44</b>	
29-1111	Registered Nurses	2,760	3,270	510	18.5%	109	\$24.84	1
29-1126	Respiratory Therapists	NA	NA	NA	NA	NA	NA	
29-2011	Medical and Clinical Laboratory Technologists	150	180	30	20.0%	7	\$22.33	2
29-2021	Dental Hygienists	280	360	80	28.6%	10	\$20.97	3
29-2034	Radiologic Technologists and Technicians	220	260	40	18.2%	8	\$20.87	4
29-2041	Emergency Medical Technicians & Paramedics	NA	NA	NA	NA	NA	NA	
29-2061	Licensed Practical & Licensed Vocat. Nurses	1,590	1,720	130	8.2%	48	\$16.19	5
29-2071	Medical Records & Health Info. Technicians	NA	NA	NA	NA	NA	NA	
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>6,360</b>	<b>7,740</b>	<b>1,380</b>	<b>21.7%</b>	<b>232</b>	<b>\$10.07</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	3,140	3,440	300	9.6%	71	\$10.28	8
31-9091	Dental Assistants	290	360	70	24.1%	15	\$12.44	6
31-9092	Medical Assistants	480	650	170	35.4%	26	\$9.57	9
43-6013	Medical Secretaries	840	910	70	8.3%	23	\$10.86	7

**EDR 8: Northern Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>60,840</b>	<b>67,930</b>	<b>7,090</b>	<b>11.7%</b>	<b>1,888</b>	<b>\$29.65</b>	
29-1111	Registered Nurses	23,510	28,500	4,990	21.2%	991	\$28.03	1
29-1126	Respiratory Therapists	950	1,100	150	15.8%	46	NA	
29-2011	Medical and Clinical Laboratory Technologists	1,590	1,730	140	8.8%	57	NA	
29-2021	Dental Hygienists	560	660	100	17.9%	15	NA	
29-2034	Radiologic Technologists and Technicians	1,710	1,990	280	16.4%	60	NA	
29-2041	Emergency Medical Technicians & Paramedics	1,770	1,990	220	12.4%	42	NA	
29-2061	Licensed Practical & Licensed Vocat. Nurses	7,050	7,520	470	6.7%	201	\$19.36	2
29-2071	Medical Records & Health Info. Technicians	910	1,100	190	20.9%	32	\$15.69	3
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>33,530</b>	<b>39,810</b>	<b>6,280</b>	<b>18.7%</b>	<b>1,149</b>	<b>\$11.97</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	14,840	16,650	1,810	12.2%	375	NA	
31-9091	Dental Assistants	2,130	2,700	570	26.8%	117	\$13.46	5
31-9092	Medical Assistants	3,090	4,300	1,210	39.2%	178	\$12.06	6
43-6013	Medical Secretaries	6,610	7,100	490	7.4%	176	\$13.57	4

**EDR 9: Northeast Central Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>34,390</b>	<b>40,670</b>	<b>6,280</b>	<b>18.3%</b>	<b>1,275</b>	<b>\$28.78</b>	
29-1111	Registered Nurses	11,420	14,150	2,730	23.9%	512	\$26.06	2
29-1126	Respiratory Therapists	610	730	120	19.7%	32	\$21.27	4
29-2011	Medical and Clinical Laboratory Technologists	600	700	100	16.7%	26	\$24.93	3
29-2021	Dental Hygienists	680	890	210	30.9%	27	\$29.47	1
29-2034	Radiologic Technologists and Technicians	990	1,220	230	23.2%	41	\$20.32	5
29-2041	Emergency Medical Technicians & Paramedics	1,450	1,710	260	17.9%	43	\$14.55	7
29-2061	Licensed Practical & Licensed Vocat. Nurses	4,450	4,920	470	10.6%	144	\$17.73	6
29-2071	Medical Records & Health Info. Technicians	710	880	170	23.9%	27	\$13.11	9
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>18,380</b>	<b>23,440</b>	<b>5,060</b>	<b>27.5%</b>	<b>786</b>	<b>\$11.26</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	8,550	9,970	1,420	16.6%	254	\$10.72	11
31-9091	Dental Assistants	940	1,240	300	31.9%	56	NA	
31-9092	Medical Assistants	2,220	3,150	930	41.9%	134	\$11.80	10
43-6013	Medical Secretaries	3,350	3,720	370	11.0%	101	\$13.17	8

**EDR 10: East Central Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>12,260</b>	<b>14,130</b>	<b>1,870</b>	<b>15.3%</b>	<b>426</b>	<b>\$26.99</b>	
29-1111	Registered Nurses	4,500	5,360	860	19.1%	180	\$23.49	2
29-1126	Respiratory Therapists	250	290	40	16.0%	12	NA	
29-2011	Medical and Clinical Laboratory Technologists	170	190	20	11.8%	7	NA	
29-2021	Dental Hygienists	190	250	60	31.6%	8	\$27.49	1
29-2034	Radiologic Technologists and Technicians	430	500	70	16.3%	15	NA	
29-2041	Emergency Medical Technicians & Paramedics	NA	NA	NA	NA	NA	NA	
29-2061	Licensed Practical & Licensed Vocat. Nurses	1,990	2,110	120	6.0%	55	\$16.04	3
29-2071	Medical Records & Health Info. Technicians	300	360	60	20.0%	10	\$11.96	4
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>8,860</b>	<b>10,740</b>	<b>1,880</b>	<b>21.2%</b>	<b>319</b>	<b>\$10.25</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	4,800	5,250	450	9.4%	108	\$9.78	7
31-9091	Dental Assistants	420	540	120	28.6%	24	NA	
31-9092	Medical Assistants	660	920	260	39.4%	38	\$10.64	6
43-6013	Medical Secretaries	1,080	1,140	60	5.6%	27	\$11.19	5

**EDR 11: Southeast Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>3,710</b>	<b>4,380</b>	<b>670</b>	<b>18.1%</b>	<b>139</b>	<b>\$23.22</b>	
29-1111	Registered Nurses	1,200	1,470	270	22.5%	52	\$23.97	1
29-1126	Respiratory Therapists	NA	NA	NA	NA	NA	NA	
29-2011	Medical and Clinical Laboratory Technologists	NA	NA	NA	NA	NA	NA	
29-2021	Dental Hygienists	NA	NA	NA	NA	NA	NA	
29-2034	Radiologic Technologists and Technicians	NA	NA	NA	NA	NA	NA	
29-2041	Emergency Medical Technicians & Paramedics	NA	NA	NA	NA	NA	NA	
29-2061	Licensed Practical & Licensed Vocat. Nurses	740	820	80	10.8%	24	\$14.66	2
29-2071	Medical Records & Health Info. Technicians	100	120	20	20.0%	3	\$12.37	3
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>2,720</b>	<b>3,520</b>	<b>800</b>	<b>29.4%</b>	<b>120</b>	<b>\$9.27</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	1,140	1,320	180	15.8%	33	\$9.14	6
31-9091	Dental Assistants	NA	NA	NA	NA	NA	NA	
31-9092	Medical Assistants	210	280	70	33.3%	11	\$10.21	5
43-6013	Medical Secretaries	390	410	20	5.1%	9	\$11.28	4

**EDR 12: Northeast Ohio**

Code	Title	Employment		Change		Average Annual Openings	2006 Average Wages	Rank EDR Wage
		2004 Annual	2014 Projected	Net	Percent			
<b>29-0000</b>	<b>Healthcare Practitioners and Technical Occupations</b>	<b>14,920</b>	<b>17,200</b>	<b>2,280</b>	<b>15.3%</b>	<b>511</b>	<b>\$27.72</b>	
29-1111	Registered Nurses	4,630	5,490	860	18.6%	183	\$27.41	1
29-1126	Respiratory Therapists	230	270	40	17.4%	12	\$21.89	3
29-2011	Medical and Clinical Laboratory Technologists	NA	NA	NA	NA	NA	NA	
29-2021	Dental Hygienists	480	640	160	33.3%	20	\$24.27	2
29-2034	Radiologic Technologists and Technicians	610	730	120	19.7%	23	\$20.56	4
29-2041	Emergency Medical Technicians & Paramedics	620	730	110	17.7%	18	\$12.73	7
29-2061	Licensed Practical & Licensed Vocat. Nurses	2,160	2,290	130	6.0%	60	\$16.92	5
29-2071	Medical Records & Health Info. Technicians	280	310	30	10.7%	7	\$13.86	6
<b>31-0000</b>	<b>Healthcare Support Occupations</b>	<b>8,830</b>	<b>10,770</b>	<b>1,940</b>	<b>22.0%</b>	<b>329</b>	<b>\$11.22</b>	
31-1012	Nursing Aides, Orderlies, and Attendants	4,110	4,390	280	6.8%	82	\$10.50	11
31-9091	Dental Assistants	470	620	150	31.9%	28	\$12.02	8
31-9092	Medical Assistants	940	1,310	370	39.4%	54	\$11.77	9
43-6013	Medical Secretaries	1,590	1,720	130	8.2%	44	\$11.60	10

NA- Data not available due to confidentiality restrictions.

Source: ODJFS, 2006b.

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