

The Health Care Workforce Shortage: An Update on the Scope and Impact on Northern Virginia January 2008



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Background and Objectives

Background and Objectives

The NoVAHealthFORCE is a coalition of business, academic, and community leaders. Its mission is to:

Establish a long-term, business-driven, sustainable strategy to address the health care workforce shortage in Northern Virginia.

PricewaterhouseCoopers was engaged to update the objective study of the scope and impact the health care work force shortage has on the region. The same twenty-four specific job titles studied three years ago were again studied.

The objectives of the study are to:

- ◆ identify the current and future Northern Virginia health care workforce needs
- ◆ identify the current and future gaps in the health care workforce
- ◆ identify the training and education impacts.

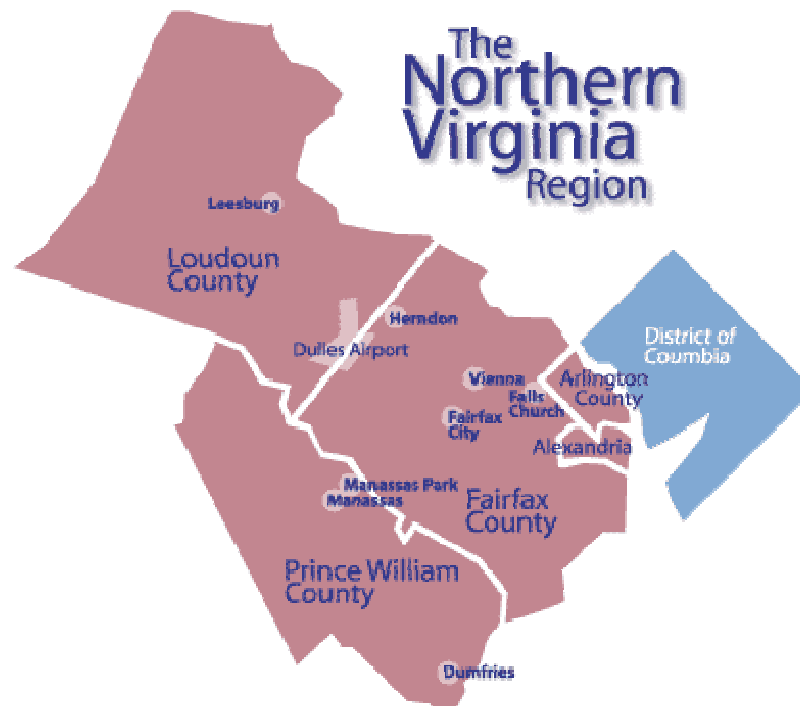
This Study Analyzes the Health Care Workforce Needs of Northern Virginia

Section 1: Northern Virginia and Its Health Care Workforce Needs

The Northern Virginia geographic region for this study included the following four counties and five cities. Over two million people live in this region.

Counties and Cities Represented in Study

Arlington County	Prince William County	City of Falls Church
Fairfax County	City of Alexandria	City of Manassas
Loudoun County	City of Fairfax	City of Manassas Park



Source: Northern Virginia Regional Commission Website

The study attempts to forecast the future health care workforce needs of Northern Virginia for 2010 and 2020. By looking this far into the future, the study tries to accommodate the cyclical nature of hiring trends. It assumes no major shifts in health policy, reimbursement or technology that would significantly alter health care demand and/or delivery.

The Growth Rate of the Northern Virginia Population is Estimated to Be about Twice the National Rate

Northern Virginia has an estimated 2.1 million people (1) and is expected to grow by 23.2% over the period 2006 to 2020. Loudoun and Prince William Counties are experiencing the highest percentage growth. Fairfax County, the study area's largest county, maintains its position as the largest county through 2020. Overall, the combined study area is expected to grow at a compounded annual rate of 1.5% -- almost twice the national rate. This growth demands more health care services.

Table 1.1 Northern Virginia Population Estimates
2006 through 2020

Northern Virginia Population Growth Estimates					
	2006 ¹⁾	2010 ²⁾	2020 ²⁾	Estimated Growth (2006-2020)	Growth in % (2006-2020)
Arlington County	194,358	200,857	212,821	18,463	9.5%
Fairfax County	1,016,483	1,038,918	1,101,144	84,661	8.3%
Loudoun County	269,605	324,189	468,979	199,374	74.0%
Prince William County	369,216	401,323	515,235	146,019	39.5%
City of Alexandria	132,343	141,116	153,175	20,832	15.7%
City of Fairfax	22,786	22,863	24,193	1,407	6.2%
City of Falls Church	11,085	10,946	11,517	432	3.9%
City of Manassas	36,576	39,539	43,654	7,078	19.4%
City of Manassas Park	13,910	12,784	15,171	1,261	9.1%
Combined Northern Virginia	2,066,363	2,192,535	2,545,889	479,526	23.2%
US ³⁾	298,145,296	308,935,581	335,804,546	37,659,250	12.6%

Sources:

- 1 Estimates of Population for Virginia & its Localities, Final 2005 & Provisional 2006, Weldon Cooper Center for Public Service, Demographics & Workforce Section, www.coopercenter.org/demographics
2. Virginia Employment Commission, Population Projections by Gender, Age, and Race/Ethnicity. <http://velma.virtuallmi.com/analyzer/session/session.asp>
- 3 US Census Bureau, Population Division, Interim State Population Projections 2005

**Section 1:
Northern Virginia and Its Health Care Workforce Needs**

This Study Examines the Most Critical Needs in the Health Care Workforce

Section 2: Current Gaps in Northern Virginia's Health Care Workforce

The health care workforce comprises numerous types of occupations. Physicians, nurses and pharmacists are among the best known and recognized careers outside of the industry. Less well known are surgical technologists, biomedical engineers, and health information technicians. For this study, 24 occupational titles were chosen to be reviewed.

These occupations were chosen using three criteria:

- Critical to providing health care services
- Shortages already developing
- Skills that will still be needed 10 to 15 years into the future

In some cases, occupations were grouped. For example, the category for registered nurses includes advanced practice nurses, such as, certified nurse anesthetists, nurse practitioners and nurse midwives.

The occupations surveyed for this study are listed in the chart in alphabetical order.

OCCUPATIONS STUDIED
CT Scanning Technologist
Dental Assistant
Dental Hygienist
Emergency Medical Technician/Paramedic
Home Health Aide
Licensed Practical Nurse
MRI Technologist
Medical and Clinical Lab Technician
Medical and Clinical Lab Technologist
Medical and Nurse Manager
Medical Records and Health Info Technician
Nursing Aide, Orderly, Certified Nurse Assistant, Attendant
Occupational Therapist
Pharmacist
Pharmacy Technician
Phlebotomist
Physical Therapist Assistant
Physical Therapist
Radiologic Technologist and Technician
Registered Nurse (including CRNA, Nurse Practitioner, and Nurse Midwife)
Respiratory Therapist
Speech Language Pathologist
Surgical Technologist
Surgical Technician

The Average Vacancy Rate of the Surveyed Health Care Occupations is over 9%

PricewaterhouseCoopers conducted a survey of Northern Virginia health care employers to estimate the size of the workforce and shortage in these critical categories. Of the 24 occupations surveyed during November and December 2007, the average vacancy rate of all of the surveyed occupations was over 9%. Nineteen of the occupations revealed a vacancy rate of 5% or more, which is significant in the health care industry.

Section 2: Current Gaps in Northern Virginia's Health Care Workforce

Table 2.1 Grouping of Occupations by Vacancy Rates

Vacancy Rates	Occupations
15% and over	CT Scanning Technologist Occupational Therapist Physical Therapist Assistant Physical Therapist Speech Language Pathologist
10% to 14.9%	Phlebotomist Registered Nurse
5% to 9.9%	Emergency Medical Technician Licensed Practical Nurse Medical and Clinical Lab Technician Medical and Nurse Manager Medical Records and Health Information Technician MRI Technologist Nurse Aide Pharmacist Pharmacy Technician Radiologic Technologist Respiratory Therapist Surgical Technician
Less than 5%	Dental Assistant Dental Hygienist Home Health Aide Medical and Clinical Lab Technologist Surgical Technologist

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Registered Nurses and All Nursing Professions are the Dominant Shortage

Section 2: Current Gaps in Northern Virginia's Health Care Workforce

**Table 2.2 Estimated Employment and Demand by Health Care Occupation
(Estimates are in FTEs for Fourth Quarter 2007)***

Occupations Studied *	Study Period Estimates			
	FTE Employment	FTE Vacancies	FTE Demand	Estimated Vacancy Percent
Registered nurses (includes CRNAs, nurse practitioners and nurse midwives)	9,981	1,344	11,325	12%
Nursing aides, orderlies, certified nurse assistants, attendants	5,721	381	6,102	6%
Home health aides	2,264	114	2,378	5%
Dental assistants	2,003	80	2,084	<5%
Medical records and health info technicians	1,672	94	1,766	5%
Licensed practical nurses	1,622	130	1,752	7%
Medical and nurse managers	1,174	96	1,269	8%
Emergency medical technician and paramedic	907	63	970	7%
Dental hygienists	895	**	895	<5%
Radiologic technologists and technicians	858	72	929	8%
Physical therapists	733	216	949	23%
Medical and clinical lab technicians	470	31	501	6%
Medical and clinical lab technologists	378	14	393	<5%
Occupational therapists	348	120	468	26%
Respiratory therapists	331	27	357	7%
Pharmacy technicians	310	18	328	6%
Pharmacists	297	19	316	6%
Physical therapist assistants	232	47	279	17%
CT Scanning technologist	225	53	278	19%
MRI technologist	212	17	230	8%
Surgical technician	197	15	212	7%
Surgical technologists	192	8	200	<5%
Speech language pathologists	178	46	224	20%
Phlebotomists	166	23	189	12%
Total	31,366	3,024	34,391	9%

*Does not include analysis of non-clinical occupational employment settings, for example, speech language pathologists in educational positions, lab research and/or wholesale laboratories or retail pharmacy positions.

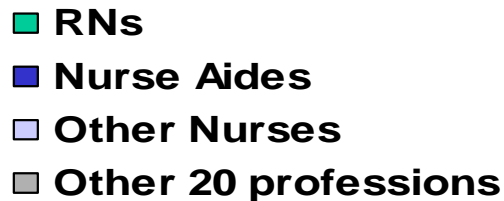
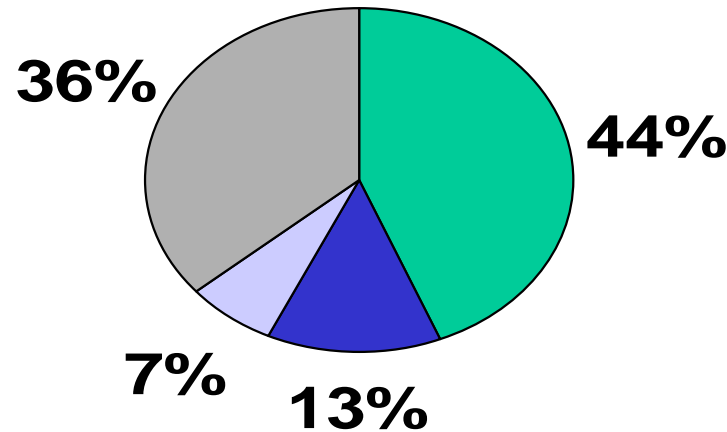
The Northern Virginia nursing vacancy rate is getting worse, according to the survey. Between 2004 and 2007, the vacancy rate for non-managerial RNs increased to 12% from 10%.

The number of openings are high in all levels of nursing, which is the backbone of many health care organizations. This vacancy rate can negatively impact the work environment and an organization's ability to provide health care services.

Nurses Comprise Most of the Health Care Workforce Demand and the Estimated Shortage

Section 2: Current Gaps in Northern Virginia's Health Care Workforce

Figure 2.1 Percent of Vacancies Related to Nursing Profession



The nursing profession represents about 64% of the current estimated number of vacancies that exist in Northern Virginia. These occupations include: registered nurses, nursing aides/certificated nurse assistants, medical and nurse managers, and licensed practical nurses. These positions comprise the overall career ladder for nursing, so it is important to recruit new talent into these positions.

This worker shortage may be further exacerbated by the following finding. "The average age of an RN in Virginia is over 45. The population of RNs currently 45 years of age is expected to begin retiring as they enter their sixties or earlier. Over the next 10 to 15 years, baby boomers will leave the workforce and become part of the population that will use health services at an increasing rate." This will have a definite impact on the RN vacancies, especially after 2015.

Quote: "Roadmap for Virginia's Health: A Report of the Governor's Health Reform Commission", October 2007

Future Shortages Will Exacerbate Today's Demand for Health Care Occupations

Section 3: Northern Virginia's Future Health Care Workforce Needs

This Table reflects the estimated current and future demand for health care occupations in Northern Virginia. The nursing profession is estimated to experience the highest demand in actual numbers, however, shortages in other occupations will also be critical.

Table 3.1 Estimated Current and Future Northern Virginia Demand for FTEs by Health Care Occupation in 2010 and 2020*

Occupations Studied	Study Period Estimates			Estimated Demand 2010	Estimated Demand 2020
	FTE Employment	FTE Vacancies	FTE Demand		
Registered nurses (includes CRNAs, nurse practitioners and nurse midwives)	9,981	1,344	11,325	12,281	16,093
Nursing aides, orderlies, certified nurse assistants, attendants	5,721	381	6,102	6,536	8,219
Home health aides	2,264	114	2,378	2,730	4,329
Dental assistants	2,003	80	2,084	2,292	3,149
Medical records and health info technicians	1,672	94	1,766	1,892	2,379
Licensed practical nurses	1,622	130	1,752	1,857	2,257
Medical and nurse managers	1,174	96	1,269	1,377	1,804
Emergency medical technician and paramedic	907	63	970	1,042	1,321
Dental hygienists	895	**	895	987	1,366
Radiologic technologists and technicians	858	72	929	988	1,210
Physical therapists	733	216	949	1,039	1,405
Medical and clinical lab technicians	470	31	501	533	653
Medical and clinical lab technologists	378	14	393	414	495
Occupational therapists	348	120	468	507	665
Respiratory therapists	331	27	357	388	508
Pharmacy technicians	310	18	328	363	510
Pharmacists	297	19	316	342	445
Physical therapist assistants	232	47	279	309	434
CT Scanning technologist	225	53	278	295	362
MRI technologist	212	17	230	244	299
Surgical technician	197	15	212	230	304
Surgical technologists	192	8	200	217	287
Speech language pathologists	178	46	224	235	278
Phlebotomists	166	23	189	201	246
Total	31,366	3,024	34,391	37,298	49,018

* 2010 and 2020 demand estimates based on BLS growth estimates adjusted for Northern Virginia population growth rates.

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Supply of New RN Graduates is Not Keeping Up with Demand

Section 4: Northern Virginia's Educational Institutions' Role in Supplying the Health Care Workforce

The following shows the estimated current and future graduations of RNs from 2006 through 2007 for the local educational institutions in Northern Virginia. It should be noted that the number of graduates begins to increase in 2008 – a result of increased enrollment. A grant from the Commonwealth of Virginia and financial contributions from the region's healthcare providers provided the necessary monies to fund the increased enrollment. However, considering the higher graduation numbers and a conservative assumption on retirements, the RN nursing supply shortage is anticipated to get worse, as shown in the lower chart.

Table 4.1 Northern Virginia Nursing School Graduations 2006-2007 and Projections to 2010 (1)

Northern Virginia Nursing Schools	2006	2007	2008	2009	2010
George Mason University	206	192	194	194	194
Marymount University	144	66	100	100	100
Northern Virginia Community College	116	124	176	255	255
Old Dominion University	0	12	32	32	32
Shenandoah University	35	36	36	36	36
Total RN graduates	501	430	538	617	617

Table 4.2 RN Nursing Supply Shortage (FTEs) Considering Retirement and Graduate Assumptions (2)

Adjusted RN Shortage	2007	2010	2020
Estimated Shortage	1,344	2,300	6,113
Cumulative Retirements		1,021	3,934
Cumulative Graduates		1,772	6,170
Adjusted Shortage	1,344	1,549	3,877

(1) Graduate numbers received from NoVAHealthForce - Assumes continued public/private investment for enrollment at the expanded 2007 levels.

(2) Retirement assumptions are that 1 in 30 of the working nurses would retire each year.

Future Workforce Shortages Will Exacerbate Today's Demand for Health Care Occupations

Section 5: Northern Virginia's Estimated Future Health Care Workforce Shortages


Table 5.1 Estimated Current FTE Employment and Estimated FTE Worker Shortages in 2010 and 2020 by Health Care Occupation (Numbers in FTEs and Reflective of 2007)*

Occupations Studied*	Study Period Estimates		Estimated FTE Worker Shortages		
	FTE Worker Employment	Estimated Study Period FTE Worker Shortage	Estimated FTE Shortage 2010	Estimated FTE Shortage 2020	Estimated 2020 FTE Worker Shortage
Registered nurses (includes CRNAs, nurse practitioners and nurse midwives)	9,981	1,344	2,300	6,113	38%
Nursing aides, orderlies, certified nurse assistants, attendants	5,721	381	815	2,498	30%
Home health aides	2,264	114	466	2,065	48%
Dental assistants	2,003	80	289	1,146	36%
Medical records and health info technicians	1,672	94	219	706	30%
Licensed practical nurses	1,622	130	235	635	28%
Medical and nurse managers	1,174	96	203	630	35%
Emergency medical technician and paramedic	907	63	135	414	31%
Dental hygienists	895	**	92	471	34%
Radiologic technologists and technicians	858	72	130	353	29%
Physical therapists	733	216	306	672	48%
Medical and clinical lab technicians	470	31	62	183	28%
Medical and clinical lab technologists	378	14	36	116	23%
Occupational therapists	348	120	160	317	48%
Respiratory therapists	331	27	57	177	35%
Pharmacy technicians	310	18	53	201	39%
Pharmacists	297	19	45	147	33%
Physical therapist assistants	232	47	76	202	46%
CT Scanning technologist	225	53	70	137	38%
MRI technologist	212	17	32	87	29%
Surgical technician	197	15	33	107	35%
Surgical technologists	192	8	25	95	33%
Speech language pathologists	178	46	57	100	36%
Phlebotomists	166	23	35	80	33%
Total	31,366	3,024	5,931	17,651	36%

This shows the estimated current employment of FTEs for the 24 surveyed occupations and the estimated shortages currently, in 2010 and in 2020. Changes related to higher than current retirements, additional educational slots, medical policy, etc. are not considered. The estimated demand is driven by a combination of the continued population growth in Northern Virginia, about twice that of the nation, and the growing demand for health care services.

These estimates do not consider any health care workforce impacts that may result from the Department of Defense Base Realignment (BRAC) initiatives.

* 2010 and 2020 demand estimates based on BLS growth estimates adjusted for Northern Virginia population growth rates.



Appendix A: Methodology

Methodology

Appendix A: Methodology

Study Process

This Study, conducted in November and December of 2007, provides an update to the original NoVA HealthForce workforce study conducted from February through May of 2004.

While numerous national and state studies have been conducted on nurse vacancy rates, this regional study encompassed a much broader range of health care occupations. Organizations surveyed included most of the hospitals and a cross section of physician offices, outpatient centers, dental offices, nursing homes, assisted living centers, home health care agencies, hospices and adult day care centers. Approximately 40 percent of the estimated FTE employment was surveyed. Survey results did vary as expected. This may have had to do with time of the year, changes in the marketplace, shifting service locations, among other factors. Results for occupations with smaller numbers can be expected to vary. In addition, we did not survey vacancy rates, but vacancies at a specific point in time.

General Methodology

Using the study instrument referenced above, data was collected regarding the total number of FTEs currently employed and current budgeted vacancies at a sampling of health care providers within the study area.

The survey data was then converted to a baseline for projecting future employment demand and vacancy shortages for the individual occupational classes within the study area. This information was also compared to U.S. and Virginia census, VDH licensing information and other pertinent information in an attempt to size the number of employed FTEs. In some cases, numbers changed from the prior study as a result of newly available benchmark data and survey results. In addition, it should be noted, that for pharmacy, speech language pathology, clinical lab technologists and technicians, etc., employment outside of the types of surveyed organizations was not included, e.g., retail pharmacies.

Locality-specific population projections, and BLS projected occupational class growth rates were the input factors in determining the projections. The resulting calculations include the general assumption that worker vacancy rates will remain unchanged over time, although adjustments were made to such rates when deemed appropriate. Growth rates for the occupations studied are based on the 10-year growth rates from 2006 to 2016, provided in the Occupational Outlook Handbook published by the Bureau of Labor and Statistics adjusted for the Northern Virginia population growth rates. The Handbook provides a range of projected growth rates for each occupational class, depending on the growth estimation category for each class. The appropriate estimate was selected and then converted to a compound annual growth rate to be applied to each of the respective baseline figures. The growth rates are adjusted for the higher rate of population growth by comparing the compound annual growth rates of the national population to the study area's projected population growth rates. Population numbers use data published by the Virginia Employment Commission's population projections team. The Commission provides an online Query Tool that projects city and county-specific population numbers at 10-year intervals. Compound annual growth rates from those projections were applied to the study area's locality-specific populations for the baseline year to determine projected population for the study area. All of the future estimates are based on publicly available data.

Definitions of Occupational Titles Surveyed for this Study

Appendix B: Occupation Definitions

CT scanning technologist	CT scanning technologists operate CT scanners to produce cross-sectional images of patients.
Dental assistants and hygienist	<p>Dental assistants perform patient care, office, and laboratory duties. They work chairside as dentists examine and treat patients. They hand instruments and materials to dentists and keep patients' mouths dry and clear by using suction or other devices. Assistants also sterilize and disinfect instruments and equipment, prepare trays of instruments for dental procedures, and instruct patients on postoperative and general oral health care.</p> <p>Dental hygienists remove soft and hard deposits from teeth, teach patients how to practice good oral hygiene, and provide other preventive dental care. Hygienists examine patients' teeth and gums, recording the presence of diseases or abnormalities. They remove calculus, stains, and plaque from teeth; perform root planning as a periodontal therapy; take and develop dental x rays; and apply cavity-preventive agents such as fluorides and pit and fissure sealants.</p>
Emergency medical technician/ and paramedic	<p>EMTs and paramedics typically are dispatched to an emergency by a 911 operator, and often work with police and fire department personnel. Once they arrive, they determine the nature and extent of the patient's condition while trying to ascertain whether the patient has preexisting medical problems. Following strict rules and guidelines, they give appropriate emergency care and, when necessary, transport the patient. Some paramedics are trained to treat patients with minor injuries on the scene of an accident or at their home without transporting them to a medical facility. Emergency treatment for more complicated problems is carried out under the direction of medical doctors by radio preceding or during transport.</p>
Home health aide	<p>Home health aides help elderly, convalescent, or disabled persons live in their own homes instead of in a health facility. Under the direction of nursing or medical staff, they provide health-related services, such as administering oral medications. Home health aides may check patients' pulse rates, temperatures, and respiration rates; help with simple prescribed exercises; keep patients' rooms neat; and help patients move from bed, bathe, dress, and groom. Occasionally, they change nonsterile dressings, give massages and alcohol rubs, or assist with braces and artificial limbs. Experienced home health aides also may assist with medical equipment such as ventilators, which help patients breathe.</p>

Definitions of Occupational Titles Surveyed for this Study

Appendix B: Occupation Definitions

Licensed practice nurse	LPNs provide basic bedside care, taking vital signs such as temperature, blood pressure, pulse, and respiration. They also prepare and give injections and enemas, monitor catheters, apply dressings, treat bedsores, and give alcohol rubs and massages. LPNs monitor their patients and report adverse reactions to medications or treatments. They collect samples for testing, perform routine laboratory tests, feed patients, and record food and fluid intake and output. To help keep patients comfortable, LPNs assist with bathing, dressing, and personal hygiene.
Medical and clinical lab technician	Lab technicians examine and analyze body fluids, tissues, and cells. Generally, they perform less complex tests and laboratory procedures than technologists perform. Technicians may prepare specimens and operate automated analyzers, for example, or they may perform manual tests in accordance with detailed instructions. Like technologists, they may work in several areas of the clinical laboratory or specialize in just one. Histotechnicians cut and stain tissue specimens for microscopic examination by pathologists, and phlebotomists collect blood samples.
Medical and clinical lab technologist	Laboratory technologists perform complex chemical, biological, hematological, immunologic, microscopic, and bacteriological tests. Technologists microscopically examine blood, tissue, and other body substances. They make cultures of body fluid and tissue samples, to determine the presence of bacteria, fungi, parasites, or other microorganisms. Clinical laboratory technologists analyze samples for chemical content or a chemical reaction and determine blood glucose and cholesterol levels. They also type and cross match blood samples for transfusions. Technologists in small laboratories perform many types of tests, whereas those in large laboratories generally specialize.
Medical and nurse manager	Nurses who hold an administrative position at the nurse manager level are responsible for the proper allocation of available resources to provide efficient and effective nursing care. The nurse manager provides input into executive-level decisions and collaborates with the nurse executive and others in organizational programming and committee work. Nurse managers assume a leadership role in planning, organizing, implementing, and controlling the care of individuals. This may include aspects of quality outcomes, staff development, care management, and research.
Medical records and health information technician	Clinical coders assign a code to each diagnosis and procedure. Technicians then use computer software to assign the patient to one of several hundred “diagnosis-related groups,” or DRGs. Registered Health Information Technicians (RHIT) are health information technicians who ensure the quality of medical records by verifying their completeness, accuracy, and proper entry into computer systems. They also use computer applications to assemble and analyze patient data for the purpose of improving patient care or controlling costs. The Registered Health Information Administrator (RHIA) is skilled in the collection, interpretation, and analysis of patient data. Additionally, they receive the training necessary to assume managerial positions related to these functions.

Definitions of Occupational Titles Surveyed for this Study

Appendix B: Occupation Definitions

MRI technologist	Radiographers operate machines that use strong magnets and radio waves, rather than radiation, to create an image.
Nursing aides, orderlies and attendant	Also known as nursing assistants, geriatric aides, unlicensed assistive personnel, or hospital attendants, these professionals perform routine tasks under the supervision of nursing and medical staff. They answer patients' call lights, deliver messages, serve meals, make beds, and help patients eat, dress, and bathe. Aides also may provide skin care to patients; take their temperatures, pulse rate, respiration rate, and blood pressure; and help patients get in and out of bed and walk. They also may escort patients to operating and examining rooms, keep patients' rooms neat, set up equipment, store and move supplies, or assist with some procedures.
Occupational therapist	OTs help people improve their ability to perform tasks in their daily living and working environments. They work with individuals who have conditions that are mentally, physically, developmentally, or emotionally disabling. They also help them to develop, recover, or maintain daily living and work skills. Occupational therapists help clients not only to improve their basic motor functions and reasoning abilities, but also to compensate for permanent loss of function. Their goal is to help clients have independent, productive, and satisfying lives. Occupational therapists also use computer programs to help clients improve decisionmaking, abstract-reasoning, problem-solving, and perceptual skills, as well as memory, sequencing, and coordination—all of which are important for independent living.
Pharmacist	Pharmacists dispense drugs prescribed by physicians and other health practitioners and provide information to patients about medications and their use. They advise physicians and other health practitioners on the selection, dosages, interactions, and side effects of medications. Pharmacists must understand the use, clinical effects, and composition of drugs, including their chemical, biological, and physical properties.
Pharmacy technician	Pharmacy technicians help licensed pharmacists provide medication and other health care products to patients. Technicians usually perform routine tasks to help prepare prescribed medication for patients, such as counting tablets and labeling bottles. Technicians refer any questions regarding prescriptions, drug information, or health matters to a pharmacist. Technicians may establish and maintain patient profiles, prepare insurance claim forms, and stock and take inventory of prescription and over-the-counter medications.

Definitions of Occupational Titles Surveyed for this Study

Appendix B: Occupation Definitions

Phlebotomist	Phlebotomists draw blood from patients for laboratory analysis
Physical therapist	(PTs provide services that help restore function, improve mobility, relieve pain, and prevent or limit permanent physical disabilities of patients suffering from injuries or disease. They restore, maintain, and promote overall fitness and health. Their patients include accident victims and individuals with disabling conditions such as low-back pain, arthritis, heart disease, fractures, head injuries, and cerebral palsy. Therapists examine patients' medical histories and then test and measure the patients' strength, range of motion, balance and coordination, posture, muscle performance, respiration, and motor function. They also determine patients' ability to be independent and reintegrate into the community or workplace after injury or illness.
Physical therapist assistant	Physical therapist assistants and aides perform components of physical therapy procedures and related tasks selected by a supervising physical therapist. These workers assist physical therapists in providing services that help improve mobility, relieve pain, and prevent or limit permanent physical disabilities of patients suffering from injuries or disease. Physical therapist assistants record the patient's responses to treatment and report the outcome of each treatment to the physical therapist.
Radiologic technologist/technician	Radiologic technologists and technicians take X-rays and administer nonradioactive materials into patients' bloodstreams for diagnostic purposes. Some specialize in diagnostic imaging technologies, such as computerized tomography (CT) and magnetic resonance imaging (MRI). Also referred to as radiographers, they also may produce X-ray films (radiographs) of parts of the human body for use in diagnosing medical problems. Radiographers position radiographic equipment at the correct angle and height over the appropriate area of a patient's body. Using instruments similar to a measuring tape, they may measure the thickness of the section to be radiographed and set controls on the equipment to produce radiographs of the appropriate density, detail, and contrast.
Registered nurse	RNs work to promote health, prevent disease, and help patients cope with illness. When providing direct patient care, they observe, assess, and record symptoms, reactions, and progress in patients; assist physicians during surgeries, treatments, and examinations; administer medications; and assist in convalescence and rehabilitation. RNs also develop and manage nursing care plans, instruct patients and their families in proper care, and help individuals and groups take steps to improve or maintain their health.

Definitions of Occupational Titles Surveyed for this Study

Appendix B: Occupation Definitions

Respiratory therapist	Respiratory therapists evaluate, treat, and care for patients with breathing or other cardiopulmonary disorders. Practicing under physician direction, they assume primary responsibility for all respiratory care therapeutic treatments and diagnostic procedures, including the supervision of respiratory therapy technicians.
Speech language pathologist	Speech-language pathologists, sometimes called speech therapists, assess, diagnose, treat, and help to prevent speech, language, cognitive, communication, voice, swallowing, fluency, and other related disorders. They work with people who cannot make speech sounds, or cannot make them clearly; those with speech rhythm and fluency problems, such as stuttering; people with voice quality problems, such as inappropriate pitch or harsh voice; those with problems understanding and producing language; those with cognitive communication impairments or hearing loss.
Surgical technician	Technicians who perform any combination of following tasks before, during, and after surgery to assist surgical team: Places equipment and supplies in operating room and arranges instruments, assists team members to place and position patient on table, scrubs arms and hands and dons gown and gloves., aids team to don gowns and gloves, maintains supply of fluids, such as plasma, saline, blood, and glucose for use during operation, hands instruments and supplies to surgeon, holds retractors, cuts sutures, and performs other tasks as directed by surgeon during operation.
Surgical technologist	Surgical technologists, also called scrubs and surgical or operating room technicians, assist in surgical operations under the supervision of surgeons or registered nurses. Before an operation, surgical technologists help prepare the operating room by setting up surgical instruments and equipment, sterile drapes, and sterile solutions. They assemble both sterile and nonsterile equipment, as well as adjust and check it to ensure it is working properly. Technologists also get patients ready for surgery by washing, shaving, and disinfecting incision sites. Technologists also observe patients' vital signs, check charts, and assist the surgical team with putting on sterile gowns and gloves.

Sources for occupational descriptions – US Department of Labor, Bureau of Health Statistics, Occupational Outlook Handbook, 2008-2009; Websters online dictionary.

Sources Used to Determine Current and Future Supply

Appendix C: Sources

	BLS Data	HRSA and VDH Data	PwC survey	PwC consultants	Various Health Professions	Interviews	Census Data
CT Scanning Technologist	X		X	X	X	X	X
Dental assistants and hygienists	X	X	X		X	X	X
EMTs and paramedics	X	X	X		X	X	X
Home health aides	X	X	X	X	X	X	X
Licensed practical nurses	X	X	X		X	X	X
Medical and clinical lab technicians	X	X	X	X	X		X
Medical and clinical lab technologists	X	X	X	X	X		X
Medical and nurse managers	X	X	X		X		X
Medical records and health info technicians	X	X	X		X	X	X
MRI technologist	X	X	X	X	X	X	X
Nursing aides, orderlies, certified nurse assistants, attendants	X	X	X		X	X	X
Occupational Therapists	X	X	X	X	X		X

This information has been prepared solely for the use and benefit of The SkillSource Group, Inc. and is not intended for reliance by any other person.

Sources Used to Determine Current and Future Supply

Appendix C: Sources

	BLS data	HRSA and VDH Data	PwC survey	PwC consultants	Various Health Professions	Interviews	Census Data
Pharmacists	X	X	X				X
Pharmacy technicians	X	X	X		X		X
Phlebotomists	X	X	X				X
Physical therapists	X	X	X	X	X		X
Physical therapist assts.	X	X	X		X		X
Radiologic technologists, technicians	X	X	X	X	X		X
RNs	X		X		X		X
Respiratory therapists	X	X	X	X	X	X	X
Speech language pathologists	X	X	X				X
Surgical technician	X	X	X	X	X	X	X
Surgical technologists	X	X	X	X	X	X	X

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Our Services were performed and this Report was developed in accordance with our engagement letter dated October 22, 2007 and are subject to the terms and conditions included therein.

- ▲ Our Services were performed in accordance with Standards for Consulting Services established by the American Institute of Certified Public Accountants ("AICPA"). Accordingly, we are providing no opinion, attestation or other form of assurance with respect to our work and we did not verify or audit any information provided to us.
- ▲ Our work was limited to the specific procedures and analysis described herein and was based only on the information made available through the completion of this Report on January 24, 2008. Accordingly, changes in circumstances after that completion date could affect the findings outlined in this Report.
- ▲ This information has been prepared solely for the use and benefit of, and pursuant to a client relationship exclusively with, The SkillSource Group, Inc. PwC disclaims any contractual or other responsibility to others based on its use and, accordingly, this information may not be relied upon by anyone other than The SkillSource Group, Inc.