Nursing and Allied Health Faculty Staffing Plan

Study Report

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Executive Summary

Introduction

The Connecticut Allied Health Workforce Policy Board (AHWPB) was established in Public Act 04-220 *(An Act Concerning Allied Health Workforce Needs)* to conduct research and planning activities related to the allied health workforce. The AHWPB's responsibilities include activities such as monitoring data and trends in the allied health workforce, identifying recruitment and retention strategies, promoting diversity, examining allied health educational programs for possible improvements and reporting on an annual basis to the legislature on its findings and recommendations regarding allied workforce strategies. "Allied heath workforce" and "allied health professionals" are defined in legislation as *professionals or paraprofessionals who are qualified by special training, education, skills and experience in providing health care, treatment and diagnostic services, under the supervision of or in collaboration with a licensed practitioner, and includes but is not limited to, physician assistants, registered nurses, licensed practical nurses, certified nurse assistants, home health aides, radiological technologists and technicians, medical therapists and other qualified technologists and technicians.*

Throughout its tenure, the Board has met regularly to discuss current initiatives in allied health in the state, gaps in workforce data, issues related to educational programming, and recruitment and retention of the workforce, as well as researching and recommending solutions to allied health workforce shortages. The AHWPB issued its first report to the legislature in February 2006. In that report, the Board identified the need for a comprehensive state faculty staffing plan to address the workforce shortages in all allied health professions.

The completed plan is intended to determine the faculty necessary to meet current and projected labor market training needs in all areas, across all public and private institutions and to outline the current and projected resources for allied health programs to meet workforce shortages. The plan includes recommendations regarding *Building a Faculty Pipeline* and for *Student Recruitment and Retention.* The researcher also identified a number of areas needing further review and study by the AHWPB.

Research Charge and Methodology

The Connecticut Women's Education and Legal Fund, which serves as staff to the Allied Health Workforce Policy Board, contracted with Belón Research and Practice to conduct the study. Working with an Advisory Committee of the AWHPB, the consultant undertook both quantitative and qualitative data analysis to formulate the report findings.

The greatest challenge faced by the researcher was dealing with data anomalies regarding allied health programs in Connecticut. These included missing, unreported, incomplete or uncollected data, differing categorization of data across agencies, and summarized data where detail regarding allied health specialties was needed. Where those problems can be remedied, and where the data repository of record is a State agency, it would be in the State's best interest to close those data holes so that reliable data is available for future research studies.

Findings

Interview data from faculty having program oversight and management of over 20 discrete allied health program areas, coupled with Department of Higher Education graduation data, Department of Labor ten year occupational projections, and current online student registration data shows that there is a current allied health worker shortage in 15 (44%) of the 34 identified career areas or clusters for which demand and graduation statistics exist. Looked at from a surplus perspective, Connecticut schools are producing more workers than needed for 19 areas (56%). However, because of the increased need for employees within allied health professions, high projected levels of retiring 'baby boomers', the aging allied health professions workforce, the current practice of hiring personnel from non-allied health educational programs which masks need figures, and the lack of data for specific queries, the full extent of the allied health worker shortage remains unclear.

Connecticut, and the nation as a whole, is facing a shortage in allied health workers that will have a profound effect on our citizens and the economic health of our State.

The area of Nursing presents the largest challenge, both with sustaining the number of annual graduates and producing even greater numbers for specific positions. With an annual need of nearly 1,100 new nurses (the highest across all allied health programs), it is imperative that the state continues, and in fact, expands its investment in the undergraduate and graduate education at public and private colleges and universities. As of 2006, Connecticut nursing schools have increased production to roughly 1,100 new registered nurses annually. However, with the current vacancy rate of 750 staff nursing positions in Connecticut hospitals, as measured by the Connecticut Hospital Association (CHA), the State still finds itself in a deficit position which the current graduate numbers can not alleviate. In addition, not all graduates will pass national certification exams. While the duration of the current level of annual need is not clear, expectations are that the figure will average about 1,100 per year through 2014. The remedy is to increase the numbers of nursing students and to focus on student retention to increase graduation numbers.

Of the allied health careers or clusters reviewed that post shortages of graduates,

- Five lacked reliable graduate data (Medical Administrative/Exec. Asst, Pharmacy Technician, Medical Transcriptionist, Radiation Therapy and Diagnostic Medical Sonography). Of those, only the areas of Radiation

Therapy and Diagnostic Medical Sonography received further study.

- Five need to recruit more students and focus on retention (Dental Laboratory Technician, Respiratory Care Therapist, Cardiovascular Perfusionist, Medical/Clinical Research Technology, and Medical Laboratory Technology).
- Two have student retention issues that, if corrected, would help alleviate the worker shortage in that field (Physical Therapy Assistant and Nuclear Medicine Technologist).
- One is on the increase and will fill the employment need in the next 1-2 years (Occupational Therapist).
- One satisfies the annual labor demand, if averaged over two years (Licensed Practical Nurse).
- One program has been suspended (Cardiovascular Technologist).
- One is an online program of study and needs marketing efforts to increase enrollments (Health Info/Med Records Technician).

The State of Connecticut must produce sufficient numbers of allied health workers if it is to have a functional health infrastructure within its borders. Expansion of both degree and non-degree programs for shortage areas is recommended in both the short and long term.

However, qualified faculty to teach these programs that possess the requisite degrees are in short supply across the allied health spectrum, compounding the problem. Additionally, the number of at-risk programs (i.e., those that are managed by only one full-time faculty member), is significant. This study identifies the problems associated with graduating larger numbers of allied health workers, including those programs categorized as at-risk.

Recommendations

Building Faculty Pipeline-As noted in the Board's 2006 Report, identification of staffing and infrastructure issues related to preparation, recruitment and retention of faculty for allied health programs in Connecticut is key to meeting the workforce needs of the health care industry in Connecticut. The following recommendations are intended to help meet that need.

- **Implement a competitive Scholarship-for-Service model, where recipients agree up front to assume faculty positions after graduation.**

  Nearly every program within nursing and allied health is vulnerable to the current, or anticipated, faculty shortage problem. Where sufficient faculty exists, it is recognized that securing replacements will be difficult. It is therefore in the best interests of the State to create a proactive plan to develop instructor talent. The Scholarship-for-Service model has been used successfully in government and the armed forces to produce employees for areas of need. Typically, tuition is covered and stipends for living expenses are offered. The commitment to teach for five years should also be a requirement. If Connecticut were to launch such a program, it would receive the added benefit of retaining graduates, and the investment made in them, within the State. Since it will take 2-6 years to move faculty to the MS and/or Ph.D. (the required level to teach in colleges), it is imperative that faculty development efforts be initiated as soon as possible. Faculty from unique programs, from programs producing insufficient graduates for labor demand, and from those programs where finding qualified faculty is an issue should be targeted for faculty replenishment programs. Specifically, these include Nursing,

Cardiovascular Technician, Cardiovascular Perfusionist, Dental Laboratory Technician, Nuclear Medicine Technologist, Respiratory Care Therapist, and Surgical Technologist.

- **Support proposed Master's in Dental Hygiene program by the University of Bridgeport.**

  The University of Bridgeport will be submitting their application for accreditation and licensure for a Master's level program in Dental Hygiene. This leadership position is laudable and is worthy of approval and support. This program will enable Connecticut to produce graduates who would have the academic credentials to serve as faculty at the State's six existing undergraduate programs, and make Connecticut the only state in the Northeast to offer the MS in Dental Hygiene.

- **Conduct a feasibility study for developing Bachelor's and Master's programs for identified careers.**

  Eight careers were identified for which the highest level of study is currently the Bachelor's degree. The suggestion is made to study the feasibility of Connecticut schools taking a leadership position within their specialties to develop Master's level programs for the following careers: Radiologic Technologist, Respiratory Care, Cardiovascular Technologist, Surgical Technologist, Therapeutic Recreation, and Nuclear Medicine Technologist. If these programs included courses aimed at producing educators, then the graduates would be well prepared to assume college faculty positions.

- **Conduct a feasibility study for developing doctoral program in Occupational Therapy.**
  The Occupational Therapy (OT) profession, as of January 2007, has elevated the entry-level education for Occupational Therapists to the Master's level. While Connecticut institutions have adjusted their programs to accommodate this shift, there is a looming opportunity that the State should consider. Master's level programs in OT will need doctoral-prepared faculty to staff the programs in the near-term. While Master's prepared instructors are acceptable, the general tendency of schools is to hire at the doctoral level. Since there are only 13 colleges within the United States that offer clinical doctorates in OT, and since the desire for hiring those possessing doctorates in OT will be on the rise, the timing may be right to determine whether or not any of Connecticut's schools has the capacity to develop a doctoral program. This opportunity will last only until there are sufficient doctoral programs within the US.

Student Recruitment and Retention-the Board has also identified the need to recruit, train and support new students in allied health fields. In addition, attention must be paid to supporting those individuals who are currently enrolled in allied health courses throughout the state.

- **Earmark funding for student support services in targeted programs.**

  Recapturing students who would be otherwise lost to programs because of academic failures will add to the graduation rates without having to incur additional teaching faculty or facilities costs. Nursing program graduation rates in 2005 ranged from 69.5% for diploma and two year programs to 78.3% for BS

programs. Sufficient studies have shown that tutoring and counseling services directly impact student program completion. Since most of the programs surveyed indicated that no funding for program-specific student services exists, and since pilot programs have already generated positive outcomes, it is recommended that funding be made available for targeted student assistance in selected nursing and allied health programs. Retention goals can vary according to disciplines, but a figure of 80% could be used as criteria for selecting programs that are falling below this rate to receive targeted retention resources. Cost savings will be directly proportional to the percent increase in retained students.

- **Utilize retired practitioners in student support roles.**

  It is recommended that solutions for adding student support services explore using retired nurses, doctors, and other allied health professionals, rather than generic counselors. Nursing and allied health students will benefit most from assistance that is offered by a trained professional. Familiarity with medical terminology, knowledge of current practices, and experience in the workplace all factor into a well-structured support experience for the student.

- **Initiate a statewide marketing campaign for allied health programs.**

  Connecticut has a need for well-trained allied health professionals. While many career programs exist within the State, some of those programs and careers go virtually unnoticed by the citizenry. Awareness campaigns, coupled with information on the location of educational programs within communities would assist many programs and begin to fill vacant seats in courses. Since many of the programs report their students as being older adults, any marketing campaigns should target that demographic, particularly those currently in entry level health care jobs.

Areas for Further Study by the Allied Health Workforce Policy Board

Over the course of the next year, the Allied Health Workforce Policy Board will convene the appropriate stakeholders to examine the following suggestions. After thorough deliberations, the AHWPB will make both administrative and legislative recommendations to address key challenges to the development and support of the allied health workforce pipeline.

Improving Data Reporting and Collection

- The completion of the development and implementation of the Department of Public Health's online allied health workforce data collection system of all licensed individuals working in allied health fields is critical to the state's workforce planning.

- Explore expansion of data reporting and collection responsibilities for those allied health programs currently not required to provide completion, certification or licensing data for their students.

- The AHWPB must continue to collect and analyze data particularly as it relates to the state's investment in workforce initiatives. Dedicated resources and sustained research and analysis should be identified and secured in order to determine the effectiveness of these interventions and possible opportunities for replication.

Potential Program Expansion and Realignment

- **Consider adding one or two additional nursing programs.**

  While the Connecticut schools of nursing are now close to producing RNs at DOL's target level, the reality is that not all graduating nurses 1.) pass the NCLEX, 2.) is at an acute care facility, 3.) desire to work full-time or 4.) stay in the state after graduation. It would be prudent for the State to be producing RNs above the level indicated by the DOL, particularly in the face of the existing backlog of unfilled positions. Program expansion need not impact facilities. In particular, the evidence from Gateway Community College and Norwalk Community College indicates that finding the clinical faculty for evening assignments, while difficult, was not impossible. Hospital staff taking on those part-time duties within the evening programs does not have to leave their day job, nor do they have to take a cut in pay to function as a faculty member. The same would be true of students who have a financial responsibility to provide support for their families. They would have the opportunity to pursue a nursing career while meeting their other obligations during the day.

- **Determine if the underserved regions of the State could support additional RN programs.**

  Currently there are two regions of the state that are fairly devoid of local allied health and nursing programs. This includes the eastern third of Connecticut and the region north and west of Waterbury. It is suggested that the 'place of residence' demographics, obtained from applications to nursing schools could be examined to discover how many applicants come from those regions of the State that have no RN program. If a qualified student body exists, then program creation or full- or feeder-programs to nearby RN programs, may be warranted in those areas. This idea could also be extended to other allied health programs that produce an insufficient supply of graduates.

- **Examine the educational levels of allied health programs, carrying out realignment, where necessary.**

  The breadth of allied health programs in CT currently addresses the State's program need, but program depth needs to be examined both for essential educational degree levels within each profession and for the number of existing programs. Some programs exist at multiple schools, but produce few graduates. Other programs, especially those that are unique within the State are at risk because they are supported by only one full-time faculty member. Still other programs produce an over-supply of graduates. It would be prudent, after examining such factors as the number of programs, geographic location, modality of delivery, and number of graduates, to identify which programs should be eliminated, duplicated in another sector of the State, or expanded to a higher academic level. While an admittedly difficult task, albeit a common practice in the business world, it is necessary if the goal is to produce a sufficient number of nursing and allied health professionals for State needs, both now and in the future.

- **Establish stronger system-to-system articulations between the CT Technical High Schools' State-funded Adult Education Allied Health programs and career ladder opportunities at two and four year institutions.**

  The allied heath programs currently located in technical high schools throughout the State would benefit from a stronger academic linkage to higher educational institutions. Career ladders should be more clearly aligned with college-level program requirements or prerequisites. The potential for facilities and personnel sharing exists as well. Allied health courses are already managed by the Extended Studies (continuing education) divisions at community colleges in particular, so the infrastructure exists to articulate with these additional programs.

Changes to Academic Programs

- **Consider change in Nursing and Licensed Practical Nurse (LPN) program model to staggered entrance.**

  Currently all but one or two nursing programs maintain the same cycle of beginning in September and graduating their students two years later in May. The 18-month LPN programs also share the same approximate start and end dates. This produces a huge number of graduates only one time a year. However, hospitals and other employers of RNs and LPNs have positions to fill during the other eleven months as well. It would be in the best interest of the State and potential employers if the nursing and LPN schools were to take in multiple cohorts of students, with entrance staggered throughout the year. This should have an additional, positive impact on the problem of finding adequate clinical sites as well as on supplying the marketplace with graduates throughout the year. Consideration of this change should be made in collaboration with employers who are currently impacted by the graduation cycle.

- **For programs offered at multiple schools, but suffering from low enrollments, explore utilizing the consortia program model currently used for the Physical Therapy Assistant program.**

  It would be prudent for the State's Community College System to identify allied health programs with consistently low enrollments at multiple campuses that could benefit from having one location that would offer the major courses within the discipline, with the remaining courses taken at the "home" institution. While not ideal in terms of the travel requirement placed on the students, courses would have a greater opportunity of filling, course cancellations should decrease, and costs should be minimized. If a travel hardship is placed on students for these high-need careers, then a mechanism for providing transportation assistance could eliminate potential student drop-out due to lack of transportation.

- **Explore use of bi-directional broadcast technology for delivery of didactic courses.**

  While online courses have the potential of reaching geographically disbursed populations, that solution for course delivery comes with a high dropout rate, typically linked to the one-directional nature of the courses and lack of direct instructor contact. Technology currently exists via the educational broadcast network or Internet that enables the students to interact in real time with their

instructor and classmates. Since several colleges already have television production studios, it is recommended that this opportunity to offer "live" classes be explored. This could provide a solution similar to the one used for the Physical Therapy Assistant program, but eliminate the need for students to drive long distances to attend uniquely offered training.

- **Determine strategy or plan of action to take with unique programs.**

  Multiple unique allied health programs were identified in the study, two of which are categorized as having direct patient contact. These programs are at risk for closure due to the inability to find qualified faculty (as in the case of Cardiovascular Technician program at St. Vincent's College), the decline in enrollments to support the program, and the expense of maintaining the program. When these unique programs close, then Connecticut has no internal source for graduates of that career area. The State needs a strategy to proactively shore up the existing programs or a plan to duplicate the programs, thus eliminating the risks that accompany single programs.

Changes to Clinical Program

- **Consider expanding the use of clinical preceptors, in light of the problem with finding qualified clinical faculty.**

  Consider replication of the best practices from the pilot study undertaken at Three Rivers Community College, where Bachelor's-prepared RNs received training to take on the role of clinical preceptor, supervised by a Master's-level RN. For sustainability, solutions should include 'quid pro quo' arrangements, such as making lab space available to hospital personnel for practice, prior to recertification exams. If the hospital is asked to release their staff from some of their duties in order to serve as preceptors, then they need to receive some service or facility usage of equal value. This will nullify the problem of perceived equity where some private institutions are remunerating the hospitals for clinical placements and use of preceptors, while State institutions can not offer monetary incentives.

- **Explore the possibility and economic potential associated with the development of a major Physical Therapy clinical training site within the State.**

  As mentioned in this report, for the field of Physical Therapy, there are not enough quality placement sites to handle PT student clinical experiences. For instance, UCONN currently has contracts with 270 organizations that, on paper, provide close to 500 different clinical rotations for their students. These sites are located throughout the United States. PT students competitively apply to these sites for their clinical training. Many of Connecticut's PT students leave the State for their clinical training, and then do not return to Connecticut when they go into practice. This brain-drain works against the State. In order to reverse this trend, an additional PT site, serving all clinical rotations, would need to be developed within Connecticut to handle larger numbers of students from in-state schools. Recommendation is to explore this possibility, potentially linking it with expansion of other disciplines that also need expanded clinical sites.

- **Develop streamlined contracts process for obtaining clinical sites.**

  One of the most time-consuming activities for program directors is contract administration of clinical sites. Directors at public and private schools reported needing up to nine months to move a contract through the approval process. If being agile and reactive is a necessary attribute of being able to secure clinical sites, then the current contract process works against it. Having a streamlined clinical site contract process would be of major assistance to all allied health programs in the State.

- **Develop standardized clinical educational plans for all allied health programs, where none currently exist, and the requisite training for clinical preceptors.**

  For those careers where no standardized clinical experience exists, it is recommended that faculty and program coordinators from Connecticut schools take a leadership position in developing clinical training programs tailored to the specific discipline. These standardized clinical educational programs could then serve as a model for schools throughout the nation. Since many of these programs utilize field practitioners as preceptors, some of whom are non-degreed, it is imperative that programs include training for those who will be supervising the students' clinical experience.

Building Business-Allied Health Alliances

- **Create a State-led Business-Academia partnership model.**

  Multiple examples of business-academic partnerships exist within Connecticut. These partnerships between the producers and consumers of allied health professionals can be crafted so that both parties benefit. Ultimately, the State benefits from both the perspective of employed citizens and from a robust allied health infrastructure. It is recommended that the existing pilot programs, such as the one in which hospital staff were mentored and trained as preceptors, be expanded to other schools. Lab facility sharing can also be handled in the same manner. While most partnerships have involved hospitals and colleges, it is further recommended that partnerships be explored between colleges and the not-so-obvious partners such as pharmaceutical companies.

Conclusion

Unfortunately, the allied health worker shortage is upon us, giving the State little time to react. Given that program expansion can not proceed without additional faculty and that the time to move from a Bachelor's degree to Master's degree is two years at a minimum and from Master's to Doctorate in five to six years, it is imperative that faculty development initiatives be designed and implemented as soon as possible. In addition, investments in initiatives that increase student retention and improve graduation rates will produce immediate, measurable results in producing higher numbers of allied health professionals.

Charge of Study

Worker shortages are nothing new, and have been well documented throughout U.S. history as our country has moved from being primarily agricultural to industrial to technology-heavy and service-based. However, at the present time, the State of Connecticut, and the nation as a whole, is facing a shortage in allied health workers that will have a profound effect on our citizens and the economic health of our State. In a nutshell, if Connecticut does not provide a robust allied health infrastructure for its citizens, then companies are not going to want to relocate here, nor will they want to stay here. The economic impact on the State is obvious. For our citizenry, and especially for our aging population, in terms of quality of life, a solid health infrastructure is a leading factor and influencer for continued residency in Connecticut.

The Allied Health Workforce Policy Board, in their February 2006 report to the Connecticut State Legislature, identified seven major issues affecting the current and projected shortage of allied health workers in the State. This report is a direct result of the call for further study into the identified faculty/infrastructure shortage issue.

This study started with the assumption that to counter a workforce shortage, the number of graduates across the various allied health programs would need to increase. Paired with that was the question of current faculty levels, and if they were sufficient to allow for increases in student enrollments. However, as with all issues, this assumption turned out to be true for only some of the programs. The following charge to the researcher for this study reflects that initial assumption. Part one of the charge included an analysis of workforce and support to meet the needs of allied health programs. Part two included research, analysis and recommendations concerning building system capacity within the allied health instructional field.

Part One

- Determine faculty necessary to meet current and projected labor market training needs in all areas, across all public and private institutions.
- Outline the current and needed resources for allied health programs to meet the shortages.

Part Two

- Identify areas in which faculty can be used across programs.
- Develop recommendations about recruiting and utilizing retired nurses as faculty members.
- Identify ways to increase the number of clinical instructors and preceptors.
- Explore partnerships with employers.
- Investigate alternative routes and accelerated pathways to obtain Bachelor's and Master's degrees for those interested in teaching.
- Propose incentives for attracting individuals to Master's and Doctoral level work to support tuition costs and offset the expenses of returning to school and withdrawing from the workforce.

Throughout this report, these charges will be addressed. However, other pressing issues, uncovered during the study, will also be reported. The report's recommendations for follow-on action items reflect the researcher's understanding of the full scope of related issues affecting the allied health programs within Connecticut.

Data Collection Methods

The data for this study relied heavily on employment numbers from the Connecticut Department of Labor (DOL), licensure numbers from the Department of Public Health (DPH), graduation statistics from the Department of Higher Education (DHE) and from over 30 interviews with directors/coordinators of allied health programs from 23 educational institutions within the State and their business partners. In addition, various websites, articles and publications were reviewed for corroborating evidence of the study's findings. [i,ii,iii,iv,v,vi,vii,viii,ix,x,xi,xii,xiii] Two allied health-focused conferences and one program advisory board meeting were also attended.[xiv ,xv]

From the preliminary analysis of DOL data and interviews with DOL personnel, those careers with the largest demand for new workers were identified. Since multiple schools within Connecticut offer the same program of study for certain careers, criteria were developed to select which schools to target for interviews. The criteria used included:

- number of program graduates (school with larger numbers or a school that showed significant increase in graduating students took priority),
- geographic location within the state (made sure that all regions of the state were included),
- unique program (i.e., offered at only one school within State),
- programs associated with the largest job needs,
- balance of private and public schools.

Data Analysis

In order to blend DOL, DHE, DPH and other data, a database was created and populated. This database was used to produce queries, charts, and tables for this report. While those queries were interesting in themselves, some of the most striking findings come from uncovering the "missing data". It needs to be noted early on in this report that graduation data is not uniformly provided to DHE. State-supported institutions and those schools that make federal loans available to students have the obligation to report their graduation figures. Those schools with no such obligation invariably are not required to report graduation figures. This includes data from programs housed at Extended Studies (Continuing Education/Adult Education) departments at high schools and 2-and 4-year colleges, the State-supported Adult Education programs housed at the State's technical high schools (data for the adult programs at the technical high schools is collected by their central office and is available upon request) and the plethora of private institutes and for-profit education companies within Connecticut.

Along with the problem of "missing data", the researcher had to make decisions as to how to count the graduates. For instance, the DOL data assigns an educational entry level to each occupation. The data is then reported as numbers of job openings within the following levels:

- Short-term On-the-Job Training
- Moderate-term On-the-Job Training
- Long-term On-the-Job Training
- Work Experience in a Related Occupation
- Post-secondary Vocational Training

- Associate Degree
- Bachelor's Degree
- Graduate Certificate or Work Experience Plus B.A. or Above
- Master's Degree
- Doctoral Degree
- First Professional Degree

In order to create more usable categories that could identify whether a program's graduates could, in fact, enter the job market at the level required for that particular field of study, the researcher designed a three-category system: (1) the student graduated with an entry level training, (2) their education was below the entry level training (preparatory), or, (3) above the level (typically indicating advanced study). With these categories, it was possible to identify whether graduates were adding to the gross number of workers in their field, or whether the graduate was already a practitioner and their new degree just advanced them in their career, without adding a "new" practitioner. Without making this distinction, a simple sum of all graduates within a particular field, regardless of the level of their degree, cannot be assumed to return the number of new professionals entering the field. This will be covered in more depth in the section on nursing data.

Other data oddities had to be dealt with as well, including misclassifications and consolidations of data from multiple disciplines under one category, so as not to be lead to incorrect conclusions. For example, the expected annual job openings and projected needs for discrete programs in Pathology Assistant and Physician Assistant are combined under one figure.

Defining allied health programs was not straightforward, in itself. The CIP (Classification for Instructional Programs) code of 51xxxx was selected for identifying educational programs that produce allied health workers. Programs with CIP codes in the 511500 to 511599 category (counselors, social workers, family therapists) were eliminated from study, as were programs for Physicians, Pharmacists, Dentists, Acupuncture, Naturopathic Medicine, and Athletic Trainers. The resulting subset of allied health workers focuses on those individuals who are actively involved in the care and handling of the ill and infirm.

One group of educational programs closely affiliated with allied health that has not been included in the study comes from CIP code 520401. This code is associated with secretarial programs that include a medical component such as medical transcription, health claims processing, medical insurance billing assistant, or medical office skills. Graduates of these Business Office Technology programs will compete directly with graduates from similar programs in the 510701-510799 code range, that is, from the areas of Health Care Administration, Office Management, and Medical Records.

Explanations of additional data anomalies will be mentioned specifically throughout this document.

Interview Questions

In order to collect comparable information from each of the various career areas interviewed, the sessions were begun, after a brief description of the objective of the study, by the researcher posing a question similar to the following one:

"If you were asked by your administration to double the size of your program next year, would it be possible? If not, what are the factors that would prevent program growth?"

During the interview, questions were directed towards gaining information in five targeted areas. These include:

- Faculty – likelihood of finding/keeping qualified faculty (full time/part time).
- Facilities – physical space for labs and didactic classes available for program expansion.
- Clinical placements – increased number of sites available.
- Students – problems with retention; student needs.
- Funding – sufficient annual budget for program disposables and marketing.

In most cases, this set of questions was sufficient to uncover the data sought for the study. Additionally, information was collected on the various professional organizations and areas, if any, which entice professionals away from their field.

Analysis of Current Supply and Demand

By Career Areas

The Bureau of Labor Statistics (USDOL) has had the task of producing labor force predictions for the country since the late 1950s. The process by which the predictions have been developed has been fine-tuned over the years. The latest iteration is the Occupational Employment Statistics (OES) program. All 50 states use this program and the associated survey instrument to collect input from approximately 1.2 million establishments, nationwide. Since 1970, all State agencies utilize the OES program to collect and submit data from their constituent businesses. In Connecticut, return rates for employment surveys remains consistently over 70%. Under analysis, projections for the major occupations have been found to be consistent with actual employment data, including the projections of both slow and rapid growth for specific occupational groups. While relatively small, specific career area data may differ from USDOL projections, the program has a 50+ year track record for correctly identifying the trends among the array of major occupational groups.

The researcher analyzed the DOL data on annual job openings and projected needs paired with number of graduates for the same period. Table 1 shows the array of allied health careers within Connecticut that were selected for this study. Twenty-eight (28) represent specific programs of study while another six represent program clusters for which only cumulative job demand data is available.

The table data is sorted in descending order by projected need. The data is described as follows:

- Educational program code
- Program Title
- Annual demand (i.e., number of job openings expected per year)
- Current 2006 graduation data
- Shortage (a subtraction of the supply of graduates from projected demand)
- Educational entry level associated with the career

Program Code	Program Title* (graduates for combined fields noted in parentheses)	Annual Demand	Current Grads	Short/ Over	Preferred Educational Entry Level
510716	Medical Administrative/Exec.Asst.	180	45	-135	Post-secondary Voc.
511613	Licensed Practical Nurse/Vocational Nurse Training	294	181	-113	Post-secondary Voc.
510805	Pharmacy Technician	81	1	-80	Moderate-term OJT Training
511004 511008 511009	***Clinical/Medical Laboratory Technician*** Histotechnician (0) Phlebotomy (unreported)	***59***	***4***	***-55***	***Associate Degree***
510707	***Health Info/Med Records Technician***	***50***	***4***	***-46***	***Associate Degree***
510708	Medical Transcriptionist	43	0	-43	Post-secondary Voc.
511002 511003 511005	Cytotechnology (5) Hematology (0) Clinical Lab Science/Medical Technologist (54)	90	59	-31	Bachelor's Degree Graduate Certificate Bachelor's Degree
510907	***Radiation Therapist*****	***36***	***5***	***-31***	***Associate Degree***
510901	***Cardiovascular Technologist Cardiovascular Perfusionist***	***29***	***4***	***-25***	***Associate Degree Graduate Certificate***
510806	***Physical Therapist Assistant***	***30***	***7***	***-23***	***Associate Degree***
510910	***Diagnostic Med Sonography/ Ultrasound Tech.*****	***29***	***9***	***-20***	***Associate Degree***
510908	***Respiratory Care Therapist***	***58***	***39***	***-19***	***Associate Degree***
512306	***Occupational Therapist***	***51***	***42***	***-9***	***Bachelor's Degree***
510603	Dental Laboratory Technician	17	11	-6	Long-term OJT Training
510905	***Nuclear Medicine Technologist***	***12***	***8***	***-4***	***Associate Degree***
512309	Therapeutic Recreation	25	27	2	Associate Degree
513104	Dietetic Technician	10	15	5	Moderate-term OJT Training
510999	Allied Health	1	10	9	Master's Degree
510602	Dental Hygienists	100	109	9	Associate Degree
513101	Dietitian –combined with Human Nutrit & Gen'l Well	20	29	9	Bachelor's Degree
510911	Radiographic Technology/Radiographer	107	117	10	Associate Degree
510803	Occupational Therapist Assistants	12	25	13	Associate Degree
510909	Surgical Technologist**	17	31	14	Post-secondary Voc.
510601	Dental Assistant	172	187	15	Moderate-term OJT Training
510204	Audiologist/Speech-Language Pathologist	57	74	17	Master's Degree
512308	Physical Therapy/Therapist	111	147	36	Master's Degree
510912 510811	Physician Assistant Pathologist Assistant	31	94	63	Bachelor's Degree
510701 512201	Health Care Administration / Management (76) Med. Health/Services Mgrs :Public Health, Gen.(198)	119	274	155	Grad Cert or Work Exp.+ B.A. Master's Degree
510904	Emergency Medical Technician and Paramedics	63	253	190	Post-secondary Voc.
510801	Medical/Clinical Assistant	253	621	368	Moderate-term OJT Training
511601 511602 511603 511604 511605 511608 511611 511699	Registered Nurse (1179) Nursing Administration (MSN/MS/PhD) (230) Adult Health Nursing (13) Biological Sciences: Anesthesia (28) Family Nurse Practitioner (7) Nursing Science, MS/PhD. (46) Community/Public Health Nursing (0) Nursing / RN to BSN Completion (0)	1081	1503	422	Associate Degree
513501	Massage Therapist	23	585	562	Post-secondary Voc.
511614	Nursing Assistant/Aide and Patient Care Ass't	921	2031	1110	Short-term OJT Training
510710++ 510713++ 510714++ 510799++	Medical Office / Long Term Health Care Admin. (1) Medical Insurance Coding Specialist (31) Medical Insurance Specialist (plus others) (225) Long Term Health Care (0)	N/A	293	N/A	Post-secondary Voc. / OJT

Table 1 – Allied Health Programs – Supply and Demand Data

Bold Italic Text = Actual Shortages, complete data

** = incomplete 2006 data

++ = These four career areas under the Medical Secretary cluster, have no direct match to any annual need figure

Table 2: Allied health careers included in the study that have either shortages or surplus. In some cases, specific programs are represented while in others, program clusters for which only cumulative job demand data is available.

Program Title	Short/Over	
Medical Administrative/ Executive Assistant	-135	The career ranking the highest need for new professionals is **Medical Administrative/ Executive Assistant**. However, it is more likely that this shortage results from a job classification issue rather than a real worker shortage. This position is classed as requiring a post-secondary educational level. Within the same DOL cluster of Medical Assisting/Secretarial, the corresponding programs of Medical Office/Long Term Health Care Administration (510710), Medical Insurance Coding Specialist (510713), and Medical Insurance Specialist (510714) reported a combined total of 293 trained workers. Since there is a great deal of similarity among these positions, a prospective job applicant trained in any of these areas can vie for positions within this cluster. The deficit of 135 trained workers specific to Medical Administrative/Executive Assistant can be cancelled out easily by the additional 293 graduates in the related fields. While hiring companies may prefer a direct match, there is a sufficient applicant pool to fill the positions. Additionally, graduates of Business Office Technology programs, with a focus area in Medical Transcription, Medical Coding, or Medical Office Administration also vie for these same Medical Admin/Executive Assistant positions. For these reasons, it would seem that the Medical Administrative/Executive Assistant category can be eliminated as a "high need" area.
Licensed Practical Nurses (LPN)	-113	The next career to examine is that of **Licensed Practical Nurses (LPN)**. Formerly, LPNs were employed in hospitals and augmented the nursing team. Now, it is more common to find LPNs in long term care facilities and home health care agencies. Because for many of the programs the length of study is 18 months, graduation figures spike every other year. In 2004, graduation rates were posted at 165, leaving a deficit worker condition of nearly 129 positions. However, because a new class is not begun until the previous class graduates, the 2005 graduation rates at the thirteen schools and institutes increased to over 500 in 2005. Graduations were back down to 181 in 2006, but the expected number for 2007 is already known to be over 300 again from just the Adult Education programs at CT Technical High Schools. This see-sawing will continue until either program entry is staggered, or until multiple cohorts can be run at the same time. However, averaging two-year cycle figures, the number of graduates covers the present demand.
Pharmacy Technician	-80	The next area of "high need", according to DOL data, is that of **Pharmacy Technician**. Unfortunately, here, again, the data is incomplete. Currently, there is only one academic Pharmacy Technician program within the State, offered at Briarwood College. Briarwood reported graduation figures of 4 for 2005 and1 for 2006. However, during the past few years, the Connecticut Pharmacists Association launched an intensive effort to help relieve the shortage in Pharmacy Technicians plaguing Connecticut. Through their efforts, four additional Pharmacy Technician programs were launched. These non-degree programs are offered through the Extended Studies division of UCONN and Manchester, Middlesex, and Norwalk Community Colleges, and at one private college (St. Vincent's). Their graduate numbers are not provided to any State department. Additionally CVS and Eckerd's drug store chains have their own in-house training programs for Pharmacy Technicians. Those numbers also do not get reported. The other mitigating factor for this reported shortage is that students studying to be Pharmacists often work as Pharmacy Technicians during their formal preparation. Data on graduation rates for both Pharmacists and Pre-Pharmacy studies shows that there would be a potential pool of close to 200 students functioning as Pharmacy Technicians during their years of study. Half that number would be sufficient to eliminate the worker shortage, as currently stated - -at least on a short-term basis, until they graduate as a Pharmacist. However, UCONN is the only college in Connecticut that offers programs in Pharmacy and Pre-Pharmacy. Because of UCONN's geographic location, it is not likely that students in those programs will be candidates for assisting pharmacies in much of the State, except for during summer and school breaks. If there is to be relief for local pharmacies, it will come through the new, non-degree Pharmacy Technician programs, located in Norwalk, Bridgeport, Middletown, and Manchester.

Program Title	Short/Over	
Medical Laboratory Technology	-55	Three medical and clinical laboratory technician programs are clustered under the DOL code for **Medical Laboratory Technology** with a reported cumulative annual demand figure of 59. The specific fields include Clinical/Medical Laboratory Technicians, Histotechnicians, and Phlebotomists. Currently, only Housatonic and Manchester Community Colleges offer laboratory technician programs. Graduation figures for the past six years have not exceeded nine (9), with only four (4) in 2006. Housatonic's Fall '06 semester's basic course, Intro to Clinical Lab Technology was cancelled for lack of enrollment and the two sophomore-level courses only had enrollments of three (3) students each. The Histotechnician program offered at Goodwin College reported zero (0) graduates in 2006. This program had existed at another institution, and was moved to Goodwin fairly recently. Data for 2007 should start to reflect graduation numbers for this program. The non-credit Phlebotomy programs which are part of this cluster are offered at four schools. Unfortunately, their graduation data is not provided to DHE. Phlebotomy is a skill learned in both Nursing and Medical Assisting programs, so the lack of graduates from stand-alone programs may not be a major issue. What is a problem is the lack of trained Laboratory Technicians that Connecticut schools are producing. With only two failing community college programs (Housatonic and Manchester), and a need equivalent to two full 30-student cohorts annually, the State's employment need for Lab Technicians is likely to continue into the foreseeable future.
Health Info/Med Records Technician	-46	The **Health Info/Med Records Technician** career field is listed as requiring an Associate Degree for entry level jobs. Currently, there are two certificate programs within the State, offered at Quinnebaug Valley Community College and Briarwood College, and two Associate Degree programs offered at Briarwood and Gateway Community College. Cumulatively, only six (6) degrees/certificates were granted in 2006 and only five (5) in 2005. The programs at Quinnebaug Valley and Gateway are both online programs. Examining their course enrollment for the 2006 Fall semester, the data shows that while Gateway's courses were all near-capacity, the three Health Information Management Technology courses offered at Quinnebaug Valley were substantially under-enrolled. Open seats in the three classes ranged from 7 to 17. Since this program of study is available online to all residents of the State, and since there is no geographic impediment to its study, a marketing thrust and awareness program of this field would be helpful in filling the open seats. Gateway has also stated that they are in need of faculty for this degree program. Clearly, this computer-intensive field of study is in need of support if the vacancy rates are to be filled.
Medical Transcriptionist	-43	**Medical Transcriptionist** is a field that is closely related to medical secretaries, but is broken out separately by DOL for annual demand and employment data. Currently, there are two schools in Connecticut that offer specific programs in Medical Transcription: Briarwood College, which offers an academic certificate, and Connecticut Training Centers (CTTC), which offers a non-degree program of study. Briarwood's program has produced no graduates for the past six years. Figures were also not available for CTTC. However, two factors need to be mentioned. First, the field of Medical Transcription is declining because of the growth in voice recognition technology. Doctors are utilizing voice recognition programs to record their case notes, rather than writing them and having to hand them off to a medical transcriptionist for entry into the patient's case record. Additionally, the career area of Business Office Technology (BOT), with specialization in medical transcription, produces graduates that would compete for any job openings. Currently, there are six community colleges (Asnuntuck, Gateway, Manchester, Middlesex, Naugatuck, and Tunxis) that offer academic certificates or options in BOT-Medical Administrative Assistant. Within the past five years, these medically-focused secretarial programs have produced from 5 to 19 graduates annually while the BOT programs produce upwards to 160 graduates, annually.
Medical/Clinical Research Technology	-31	The next set of reported data, in terms of job need, is a group clustered under the heading of **Medical/Clinical Research Technology**. This group is made up of cytotechnologists, hematologists, and clinical/medical lab science technologists. Their entry educational level is a Bachelor degree. Currently, there are seven (7) clinical/medical science programs (5 BS, 1 Grad certificate, 1 MHS), one (1) cytotechnology program, and one (1) hematology program within Connecticut. As was seen with the closely related cluster for Medical Laboratory Technology, there is a definite weakness in the production of these lab researchers and technicians. While these careers do not typically have direct patient contact or care responsibilities, they do provide the clinical information that assists with diagnoses and treatment options. This support area needs assistance in increasing the numbers of enrolled students.

Program Title	Short/Over	
Radiation Therapy	-31	**Radiation Therapy** is offered only at Gateway Community College as a degree-bearing program. (Note: Hartford Hospital lists a radiation therapy program (non-degree) but no statistics were provided on graduates.) The Gateway program is supported by two full-time faculty, 1 part-time clinical instructor, and 2 adjuncts. By accreditation standards, this program has a 1-1 student/faculty clinical ratio. The program has been graduating between 3 and 8 students per year for the past six years. Enrollment for the Fall '06 semester in the two freshman level courses was 10 each (classes capped at 12). However, only two students were registered for each of the four sophomore level courses. This drop-off in students keeps the graduation numbers low. For comparison purposes, while the DOL estimates the annual demand at 36 job openings, the Connecticut Hospital Association's (CHA) statistics for their 27 acute care hospitals posted only one full-time position that was open as they entered 2006. Radiation Therapists are utilized in hospitals, cancer clinics and doctor's offices across the State. To increase graduates, the reasons for program drop-out should be identified and remedied, where possible.
Cardiovascular Technology/ Cardiovascular Perfusion	-25	The program cluster which includes **Cardiovascular Technology** and **Cardiovascular Perfusion** links two similar sounding but different occupations. There is only one school within the state where each of these specialties is located. Unfortunately, the hosting school for Cardiovascular Technology, St. Vincent's College, has been unsuccessful in their faculty searches for the past two years, and has decided to suspend the program. For Connecticut, that means that institutions needing Cardiovascular Technologists will have to look outside the State for employees. For comparison, CHA reports that their member hospitals employ 51 Cardiovascular Technologists, with a 1.4 FTE opening as they entered 2006. St. Vincent's had been graduating around four students per year up until 2006 when the program was suspended. The remaining Cardiovascular Perfusionist program at Quinnipiac University has been graduating only four or five students over the past three years and is at risk of closing as well.
Physical Therapy Assistant	-23	The **Physical Therapy Assistant** programs offered jointly at six of the community colleges (Capital, Housatonic, Manchester, Naugatuck Valley, Northwestern, and Tunxis) share one faculty member who is housed at Naugatuck Valley and conducts all PTA courses there. The student population must travel to Naugatuck for the PTA courses, but can remain on their home campuses for the general education courses within the degree program. Collectively, they graduated seven (7) students in 2006, and from 6 to 14 in the previous five years. Since multiple programs would not be viable individually, this consortia solution has worked well and allowed enrollments at the schools to be pooled. While, for students, the logistics of driving from disparate geographical locations within the state to Naugatuck can be daunting, it is a solution for a program that otherwise would not be viable. Marketing efforts would be helpful in increasing the visibility of this program.
Diagnostic Medical Sonography/ Ultrasound Technician	-20	Another unique degree program for Connecticut is that of **Diagnostic Medical Sonography/ Ultrasound Technician,** offered at Gateway Community College (Certificate and Associate degree). Yale-New Haven Hospital advertises a non-degree diagnostic ultrasound program, but no graduation statistics were available. Classes at Gateway are capped at 12 students. Annual labor demand for this specialty is set at 29. The program has been graduating between 9 and 15 students over the past three years. For the Fall '06 semester, the three freshman courses had 11 students enrolled, and the three sophomore classes had enrollments of 9 each. The program is supported by two full-time faculty and several adjunct instructors. The program coordinator has indicated that finding both qualified faculty and clinical sites are major impediments to program expansion. Given the course caps of 12 and shortage of faculty to support additional sections, the program will continue to graduate minimal numbers of students, keeping the State in a shortage condition.

Program Title	Short/Over	
Respiratory Care Therapists	-19	Programs for producing **Respiratory Care Therapists** have existed in Connecticut since 1970. Currently, there are four Associate degree programs offered at Manchester, Naugatuck Valley, and Norwalk Community Colleges and a new program at Goodwin College. The University of Hartford and Quinnipiac University offer Bachelor's degrees in Respiratory Care, but Quinnipiac has made the decision to close their program. While collectively, these programs have been graduating from 26 to 39 annually since 2000, individually they graduate around seven (7) students. Looking at Fall course registrations at the three community colleges, none of the classes were at capacity for either freshman or sophomore level courses. In terms of demand, DOL places the annual figure at 58, while Connecticut Hospital Association entered 2006 with 36.8 FTE openings alone. In addition to being employed in acute care facilities, Respiratory Therapists are needed in increasing numbers in long term care facilities and sleep labs. This career will be discussed in greater depth in a following section.
Occupational Therapists	-9	The educational entry level for **Occupational Therapists**, as of 2007 is the Master's degree. Both Quinnipiac University and Sacred Heart University offer an MS in OT. Previously, both Quinnipiac and the University of Hartford offered BS degrees, but these programs have been closed down and/or replaced by Master's level programs. Collectively, these schools had been graduating well over 100 graduates annually, but because of the change to the educational entry level specified by their professional association, the number of both programs and graduates had steadily dropped. During this period of professional change, Master's graduates have risen from 0 in 2002 to 38 in 2006. If this trend continues, there should be sufficient graduates to fill labor demand within the next few years.
Dental Laboratory Technician	-6	The career field of **Dental Laboratory Technician** is listed as demanding a post-high school, long-term OJT training. Currently, there is only one program within the State that prepares Dental Laboratory Technicians, and it is housed at Eli Whitney Technical High School in Hamden, and is offered through the State-supported Adult Education program. The director of the Adult Education Allied Health programs, when interviewed, stated that the program is 12 months in length and has a student cohort size of 24. If 75% of the class were to graduate annually, that would completely cover the State's labor need. Additional marketing exposure would help this program attract more students
Nuclear Medicine Technologist	-4	The final career field posting a worker shortage is that of **Nuclear Medicine Technologist.** The educational entry level is the Associate degree. However, the Society of Nuclear Medicine Technology, in a position paper, is urging the profession to revise the entry level to that of BS degree by 2015. Up until recently, this was yet another of Connecticut's uniquely offered programs, found only at Gateway Community College, and is offered both as a certificate and an AS. As of Fall of 2006, Briarwood College opened a Nuclear Medicine Technology program, but it will be at least two years before the first students complete the program. Over the past six years, Gateway's program graduates have ranged from a low of 4 students to a high of 17, with 10 graduating in 2006. Fall enrollment for the freshman level courses was at capacity (15 seats), but the sophomore level courses were enrolled at only half-capacity (8 seats filled out of 15). Enhancing graduate levels appears to be a student retention issue, similar to that of Radiation Therapy.
Surgical Technologists	+14	**Surgical Technologists** are trained via on-the-job training (OJT), formal hospital-supplied programs, adult education programs, and college-level academic programs. The number of graduates reported in Table 1 comes from the 2006 AS degree program graduation data from Manchester Community College and the Adult Education programs located at the State Technical High Schools. Currently, the Manchester program is at capacity in terms of enrollment (24-student cohort), and graduations have averaged 14 for the past three years, with a high of 18 reported in 2006. Although data was not available from all sources on number of workers trained in 2006 through hospital programs or OJT, an additional 14 trained workers were reported to the DOL in 2006 from the Adult Education programs at the CT Technical High Schools. While college-trained Surgical Technologists are preferred over lower-level programs, the annual employment demand of 17 is more than adequately covered.

Program Title	Short/Over	
EMT/Paramedic	+190	The career field of **EMT/Paramedic** needs some explanation. The DOL demand data is a summation of all the various types of EMT/Paramedic positions, whether full or part time, around the State. According to the National Registry of Emergency Medical Technicians (NREMT), there are four levels of EMT, the highest of which is EMT-Paramedic. Unfortunately, the DOL data does not differentiate amongst the four levels within their demand statistic. The Department of Public Health – Office of Emergency Medical Services offers EMT level 1 through 3 training at various locations around the state on an ongoing basis. Currently, the number of students who complete these training programs is neither reported to DHE nor available through DPH. However, it is known that in 2005, the number of first-time EMT level 1 licenses awarded increased by 202 over the 2004 figures. For EMT-Paramedic, there are three college-level programs available, at Capital Community College, Goodwin College, and Norwalk Community College. The Norwalk certificate program, recently reactivated, and the new certificate program at Goodwin as yet have produced no graduates. The AS degree program at Capital graduated 2 students in 2006 (one at the instructor level) and the Paramedic certificate program graduated another 11. This field is currently evolving and the training demands are increasing. Hospitals are now employing the higher-trained Paramedics for use within their facilities. Additionally, the US Department of Labor has stated that "employment of emergency medical technicians and paramedics is expected to grow much faster than the average for all occupations through 2014, as full-time paid EMTs and paramedics replace unpaid volunteers."[17] Because of these factors, it is recommended that all Paramedic programs within Connecticut receive support in attracting and retaining students so as to increase the number of Paramedics within the State.
Registered Nurse	+422	The final career that needs additional, clarifying comments is that of **Nursing**. The graduation figures as reported by DOL include graduates of Bridgeport Hospital's RN program who were also awarded an AS degree from Housatonic (double-counted) and specialty preparation programs such as Nurse Anesthetist and Public Health Nursing that demand a Master's degree or higher. The data for this vital career area is discussed in greater detail in a following section. Suffice it to say that while this career's educational entry level is at the Associate level, Bachelor's degree programs at Connecticut schools also produce first-time Registered Nurses. While not all allied health careers demand personal licensure, or certifications, graduates of nursing programs must take the NCLEX (Nursing Certification and Licensure Exam) to receive their RN designation and qualification to work as Registered Nurses within the health care industry. Because the nursing shortage has received so much national attention, special care was given to this set of need and graduation figures. The demand figure of 1081 job openings per year is the most recent figure from the CT Department of Labor. The graduation figure represents all graduates from nursing programs within the Nursing cluster, but is *not* equivalent to the number of new nurses produced annually. Compounding the problem is the very real issue of unfilled staff nursing positions at the CHA-member hospitals. CHA entered 2006 in a deficit position of over 740 staff nurses, which steadily increased throughout the year as employees retired or changed jobs. Since the estimated number of new nursing graduates for 2006 was just shy of 1060, it is easy to see that the CHA-member hospitals could easily use up all the 2006 graduates, leaving few for the rest of the medical community (e.g., doctor's offices, clinics, home heath care, school nursing). More discussion on this topic will follow in the section specific to Nursing.

Review

Of the careers or clusters reviewed above that post shortages of graduates:

- one program has been suspended (Cardiovascular Technologist),
- one is on the increase and will fill the employment need in the next 1-2 years (Occupational Therapist),
- one satisfies the annual labor demand, if averaged over two years (Licensed Practical Nurse),
- three lacked reliable graduate data but seem to be covering the need through other sources, and can be eliminated from further consideration (Medical Administrative/Exec. Asst, Pharmacy Technician, Medical Transcriptionist),
- two are online programs of study and need marketing efforts to increase enrollments (Health Info/Med Records Technician at both Quinnebaug and Gateway Community Colleges, although GCC's program is suspended until faculty can be found),
- three have student retention issues that, if corrected, would help alleviate the worker shortage in that field (Physical Therapy Assistant, Nuclear Medicine Technologist, Radiation Therapy),
- five need to recruit more students and focus on retention (Dental Laboratory Technician, Respiratory Care Therapist, Cardiovascular Perfusionist, Medical/Clinical Research Technology, and Medical Laboratory Technology), and,
- two programs (Radiation Therapy and Diagnostic Medical Sonography) would need to expand, doubling the number of their student cohorts to be able to meet the DOL demand figures. (Note: these are unique degree programs in CT, both located at Gateway CC.)

The good news is that the solution to graduating more students for most of these programs does not involve hiring additional faculty or requesting additional laboratory facilities. If additional students were either added to the programs or retained through student retention efforts, those increased numbers would affect the ongoing problem with finding adequate clinical practicum sites.

Having four unique programs in this list is not good news. The risk of having any of these programs close would effectively wipe out the source for even the small numbers now produced, as seen in the case of the Cardiovascular Technician program.

Of the programs where student recruitment is the major issue, both Clinical/Medical Laboratory Technician and Clinical Lab Science/Medical Technologist fields need to be mentioned because they both post annual job openings of 59 and 90, respectively. The Associate level program of Clinical/Medical Laboratory Technician produces hardly enough to keep the program open. The Bachelor's level Clinical Lab Science/Medical Technologist program graduates two-thirds of the needed number. While a strong, well thought out marketing and awareness campaign for these two specialties may help in recruiting additional students, what is probably more likely is that these programs reflect the national downward trend in high school graduates going into the science professions. There may be no easy answer to rebuilding this laboratory specialty.

Table 3 provides a listing of proposed actions that might be undertaken to address workforce shortages in allied health fields building this specialty.

Program Title	Summary Actions
Cardiovascular Perfusionist	Student recruitment and student retention efforts needed.
Clinical Lab Science/Medical Technologist	Program marketing, recruitment, and retention effort needed.
Cardiovascular Technologist	Unique program, currently suspended. Assistance in finding or educationally preparing qualified faculty needed.
Clinical/Medical Laboratory Technicians	Program marketing, recruitment, and retention effort needed.
Dental Laboratory Technician	Program marketing, recruitment, and retention effort needed.
Diagnostic Med Sonography/ Ultrasound Tech.	Unique program. Program expansion needed. Support in finding or developing qualified faculty needed.
Health Info/Med Records Technician	Program marketing and recruitment effort needed to fill program.
Licensed Practical Nurse	Adequate supply; Suggest staggering class start=dates to smooth out graduation cycles across the 18 mo. Period.
Medical Administrative/Exec. Assistant	Adequate supply; no action needed.
Medical Transcriptionist	No action needed; supply augmented by BOT graduates; transcription diminishing as a profession, being replaced by voice recognition technology.
Nuclear Medicine Technologist	Unique program. Program marketing, recruitment and student retention efforts needed.
Occupational Therapist	Trend indicates that graduates will fill the current demand by 2007.
Pharmacy Technician	Supply unknown; Data on graduates needs to be collected from non-credit programs.
Physical Therapist Assistant	Program marketing, recruitment and student retention efforts needed.
Radiation Therapist	Unique program. Program expansion, student recruitment and student retention efforts needed.
Respiratory Care Therapist	Program marketing, recruitment, and retention effort needed; Assistance in finding or educationally preparing qualified faculty needed.

Table 3 – Summary Actions
Allied Health Programs with Insufficient Graduates for Labor Demand

When the data on employment need for those careers that post annual shortages is examined, sorted by the required educational level, an interesting different picture emerges.

- Four (4) programs need no academic degree
- Eight (8) programs are at the Associate degree level
- Two (2) programs or clusters demand a Bachelor's degree or higher

Of the four programs for which post-high school vocational or on-the-job training (OJT) is the entry requirement, all but one (Dental Laboratory Technician) can be studied at the Associate degree or academic certificate level. In general, interview data for this study consistently identified a trend across health care disciplines to push for higher levels of education for practitioners. Entry level for Physical Therapists is slated to move to the doctoral level. Nursing has been lobbying for years to make their entry level the BSN. In light of the increased use of technology within healthcare and the ever-increasing knowledge of the functioning of the human body and associated diseases, it is not surprising that the content of educational programs has increased to the point that expanded program length is a necessity. While these are issues for accreditation bodies, it is important to point out that a more educated workforce is of higher value to the State than one that just meets minimal educational standards.

If the three OJT programs for which Associate degrees/certificates exist are added to the other eight Associate degree programs, then those 11 career areas represent close to 80% of the 14 careers for which Connecticut schools need to produce more educated workers. The majority of those programs are to be found at one or more of the State's community colleges and 2-year private

schools. This seems to suggest that focusing resources in support of program growth and/or student retention at the certificate and two year level would be logical. Additional discussion on the specifics of several of the programs will be found in subsequent sections of this report.

Program Code	Program Title* (graduates for combined fields noted in parentheses)	Annual Demand	Current Grads	Short/ Over	Preferred Educational Entry Level
510716	Medical Administrative/Executive .Assistant.	180	45	135	Post-secondary Voc.
510708	Medical Transcriptionist	43	0	43	Post-secondary Voc.
510805	Pharmacy Technician	81	1	80	Moderate-term OJT
510603	Dental Laboratory Technician	17	10	7	Long-term OJT Training
510901	Cardiovascular Technologist Cardiovascular Perfusionist	29	4	25	Associate Degree Graduate Certificate
511004	Clinical/Medical Laboratory Technician	59	4	55	Associate Degree
510910	Diagnostic Med Sonography/ Ultrasound Tech.	29	9	20	Associate Degree
510707	Health Info/Med Records Technician	50	4	46	Associate Degree
510905	Nuclear Medicine Technologist	12	8	4	Associate Degree
510806	Physical Therapist Assistant	30	7	23	Associate Degree
510907	Radiation Therapist	36	5	31	Associate Degree
510908	Respiratory Care Therapist	58	39	19	Associate Degree
511002 511003 511005	Cytotechnology (5) Hematology (0) Clinical Lab Science/Medical Technologist (54)	90	59	31	Bachelor's Degree Graduate Certificate Bachelor's Degree
512306	Occupational Therapist	51	42	9	Bachelor's Degree

Table 4 – Career Areas with Worker Shortages, Sorted by Educational Entry Level

Career Areas with No Corresponding Programs in State

In their Supply-Demand report, the Department of Labor lists five (5) allied health careers for which there are no direct corresponding programs within Connecticut. This data comes from occupational projections based on surveys of employers within Connecticut that report their employment levels across a standardized list of job titles. (See Table 4)

As can be seen from the data, all of these positions post low job need figures. Since three of the five call for only OJT training, the education of new hires is most likely handled by the hiring company. Psychiatric Aides, while needing some specialized training for that population, can be drawn from the pool of graduates from Patient Care Aides or from one of the counseling careers listed under Psychiatric/Mental Health Services.

Position	Preferred Educational Entry Level	Need
Medical Equipment Repairers	Associate	13
Orthotists and Prosthetists	Bachelor	7
Medical Appliance Technician	OJT	1
Medical Equipment Preparer	OJT	12
Psychiatric Aides	OJT	15

Table 5**– Positions for which no training programs exist in Connecticut**

From this data, it can be concluded that the lack of educational programs to produce these types of skilled job applicants has very little impact on Connecticut's heath infrastructure and introduces little risk to the State.

Program Distribution Data

In order to explore remedies for worker shortages, it is imperative to look at both the number of existing programs within the state for each of the programs and also look at their geographic position. Community colleges and private institutes typically draw their populations from their surrounding area. It is rare to have students drive long distances to attend classes unless the program offered there is unique.

The profile of community college students show that their average age is 28. Many hold down at least one job and may be the main economic provider for their family. These factors limit their ability to drive long distances to a higher education institution. To make education available to them, the programs must be locally accessible or available online.

Appendix 2 contains the listing of allied health programs found within Connecticut, both degree-granting and non-degree (diploma or certificate of completion) programs. Table 6 extracts just those programs which are uniquely offered within the state. That is, only one active program exists in Connecticut. For clarification, where one institution offered two or more degrees for the same major, but were the only school in Connecticut to do so, those programs were counted as unique. Obviously, if only one institution supports the entire state for producing a specific profession, that elevates the risk factor within the State in its ability to produce sufficient graduates for the job market.

Program Code	School-Program-Name	Preferred Entry Level Education	Degree Conferred	Institution Name	Location
511604	***Biological Sciences: Anesthesia***	***Master's Degree***	***MS***	***Fairfield University***	***Fairfield***
510603	Dental Laboratory	Long-term OJT	None	Eli Whitney Regional Voc. Tech.	Hamden
510811	Pathologists' Assistant	Bachelor's Degree	MHS	Quinnipiac University	Hamden
510901	Cardiovascular Perfusion	Post BS	GRAD	Quinnipiac University	Hamden
511008	Histotechnician	Post-sec. Voc. Trn	C3	Goodwin College	Hartford
511611	***Community/Public Health Nursing***	***Master's Degree***	***MSN***	***University of Hartford***	***Hartford***
511002	Cytotechnology	Bachelor's Degree	BS	University of Connecticut	Storrs
511003	Hematology	Master's Degree	MS	Quinnipiac University	Hamden
511103	Pharmacy Studies	Bachelor's Degree	BS	University of Connecticut	Storrs

Table 6 – CT Allied Health Programs Offered At Only One Institution
Bold Italic text - designates direct patient contact
C2 = Academic certificate, from 15 – 30 semester hour credits
C3 = Academic certificate, from 31 – 59 semester hour credits

What can be seen from Table 6 is that Connecticut has nine unique allied health programs, four (4) of which are given at undergrad or technical schools, and another five (5) at the graduate level. From a risk perspective, it would be preferable to have more than one school hosting any of these

programs within the State. However, as will be covered below when specific programs are discussed, many of these programs, especially the technician programs found at community colleges, have heavy expenses in terms of equipment and annual maintenance fees. Opening a new program in any of these fields will be expensive, but if the need for employees is to be met, a necessity.

When these unique programs are looked at from a geographic perspective, what is immediately apparent is that, with the exception of one program, all hosting institutions are located along or close to the I-91 and I-84 corridors, from New Haven to Storrs. When looking at just the unique programs offered at vocational up through undergraduate, five (5) of the eight (8) are located in the New Haven/Hamden area.

Start	Destination	Distance Miles	Est. Driving Time
Danbury	Hartford	57	**65 min.**
Danbury	New Haven	36	57 min.
Danbury	Storrs	87	**98 min.**
Hartford	Storrs	28	35 min.
New Haven	Hartford	39	43 min.
New Haven	Storrs	63	**72 min.**
New London	Hartford	47	55 min.
New London	New Haven	48	54 min.
New London	Storrs	36	58 min.
Stamford	Hartford	80	**89 min.**
Stamford	New Haven	42	52 min.
Stamford	Storrs	103	**117 min.**
Waterbury	Hartford	30	39 min.
Waterbury	New Haven	22	37 min.
Waterbury	Storrs	60	**72 mi.**

Table 7 Distances between CT Cities and Program Locations

NOTE: Bolded times exceed one hour

Data source – Google Maps

While travel might not be an issue for students at the Bachelor's and graduate degree levels because of either campus residency or program schedule, it is a negative factor for attracting students to programs when the driving distance exceeds their capabilities of balancing work, family and school demands**.**

For reference, the Table 7 indicates distances and drive times (under average road conditions) between major Connecticut cites and the three hubs where the identified unique programs are located.

Interview Data

The interview data for this study focused on uncovering whether or not it is possible to increase the number of allied health graduates in Connecticut programs. The original assumption, given in the charge to the study, was to determine if the student capacity of individual programs could be

expanded, and, if so, what were the factors that would hinder such an expansion. A corollary issue was to determine the number of faculty required for program expansion.

Previous studies of nursing programs identified five areas that would be affected by program expansion. These include:

- hiring qualified faculty
- increasing the number of on-campus lab facilities and equipment (with increases to budgets for annual equipment maintenance fees)
- funding for marketing and program "disposables" (e.g., tongue depressors, syringes)
- adding funding for student support services staff positions (full time and part time)
- expanding the number of contracted, clinical placement sites

Since this study focused on all allied heath programs, the main interview question was crafted to elicit responses that could be compared with the results from studies that focused specifically on nursing. As mentioned in a previous section, each interviewee was asked whether the existing program could be expanded, and what roadblocks to expansion could be foreseen.

Consistently, across all interviews, the responses fell into the same five categories that were identified in the nursing program studies. Interestingly enough, all interviewees were satisfied with their current annual budgets for program expenses (e.g., minimal marketing, office supplies, and program disposables). However, the remaining four areas received strong, negative responses.

Qualified Faculty

With few exceptions, those interviewed identified finding qualified faculty as one of the major issues in any program expansion. Here are some of their stories:

- One college reported that they had conducted national searches for a Cardio-respiratory Therapy professional for the past two years and has not been able to fill the position. They are suspending their program (St. Vincent's College).
- Another institution that was looking to hire a part-time instructor in medical coding reported needing two years to eventually find a qualified candidate (Briarwood College).
- A director of a Physical Therapy program ran a year-long search for a full time faculty slot, only to come up empty (University of Connecticut).
- A national search for a full-time faculty position within a Dental Hygienist program was conducted and, out of only five resumes submitted, two were not qualified (Tunxis Community College).

These statements report the reality of recent attempts to fill open faculty positions in existing programs. For those programs that are currently stable and not in need of hiring faculty, the comments on the likelihood of finding qualified instructors when the need arose were consistently negative. The natural follow-on question is why qualified instructors cannot be found. The answer to that varies across the different careers. In order to put the statistics on program graduates in the correct light, it must be stated that by accreditation standards, to teach at a 2-year college in any discipline, the prospective faculty member must possess a Master's degree in the field of study. While waivers for compelling reasons can be granted for candidates possessing less than a Master's degree, 2-year colleges prefer to hire at the Master's level as a minimum requirement. The 4-year schools and universities can also hire Master's-prepared individuals to teach in undergraduate

programs, but prefer to hire those candidates who are doctorally-prepared and can also teach in the Master's and Doctoral programs of the school.

For diploma, adult education, and institute programs (non-degree), they also have accreditation requirements through the programs' professional organizations that recommend the educational level of their faculty. The problem is that for fields of study that do not have corresponding programs at the academic level (such as OJT positions), instructors tend to be practitioners with requisite experience but little or no college preparation. If the education for a specific career area ends at the Associate degree level, then the problem of finding qualified instructors gets pushed one step higher, to the 4-year college. Without a baccalaureate program for a field of study, the 2-year colleges must look for a practitioner in the field who has completed a BS and MS in a related field so as to fulfill the Master's degree qualification for full-time faculty.

Returning to the question of why qualified faculty are in short supply, when looking at graduation rates across the various careers, it is quickly apparent that the numbers of graduates who move from Associate to Bachelor's to Master's degrees decrease dramatically at each step—where a follow-on level of education exists. When the data on students entering BSN programs is examined for academic years 2003-04, 2004-05, and 2005-06, the percentage of students who had already earned an RN from an Associate degree or diploma program ranged from a low of 19.2% to a high of 32.6% (three-year average of 25.67%).

At the Master's level, the picture is a bit fuzzier. Of the 328 MSN degrees conferred in 2006, 166 were granted by Yale University. Yale attracts students from around the nation and the world. Since the number of graduates remaining in Connecticut after graduation is not known, utilizing the raw MSN graduation numbers to draw conclusions on their availability for work within the state is not sound. It would be safer to subtract out all or a portion of the Yale graduates to obtain a more usable number.

Graduation rates, collected over the past six years from degrees earned at Connecticut's two institutions that offer doctoral programs in Nursing, average only 13 degrees awarded annually. National statistics for nurses estimate that only 1-2% of RNs ever complete a doctorate in Nursing. The figure for the total number of MSN nurses currently licensed in Connecticut, equivalent to the potential pool of candidates for doctoral programs, is unknown. However, over the past six years, Connecticut schools have conferred approximately 1,300 Master's degrees in Nursing. Comparing that pool of potential doctoral students to the number of doctoral graduates, returns a .05% ratio of candidates to graduates, far less than the national statistic.

It should be noted that while Connecticut is producing Master's-prepared nursing professionals, only a fraction of that population has career aspirations of working in higher education. Of the 1,300 Master's degree graduates, only 230 graduated from programs specializing in Nursing Education, offered at Southern CT State University and the University of Hartford. As has been documented elsewhere, salary differentials between college faculty and acute care nursing positions vary by as much as $30,000 or more annually. That salary variance is typically mentioned in studies as a major contributing factor for the low size of the candidate pool for faculty appointments. However, personal goals and family situations play just as great a role in career choices, as do economics. Graduation numbers alone cannot be used to predict whether or not sufficient numbers of candidates for academic positions exist. While hard data does not exist, one program director commented that clearly 60% of her institution's MSN graduates from Nursing Education programs stay at the facility in which they were employed while they were pursuing their degree. Many move

into staff development or educational research within their institution. It is unknown how many of the remaining 40% of the graduates seek out faculty teaching positions within nursing schools.

From the October 2005 report entitled "Enhancing the Education and Supply of Nurses in Connecticut: Report and Recommendations"[4], the number of full-time Nursing faculty projected to retire within the next 3 years was listed as 33. No breakdown was available to identify how many of those retiring faculty worked in AS or BSN programs, as opposed to MS and PhD programs. However, given that close to half the nursing programs in Connecticut are at the diploma, AS or BS level, where the faculty requirement is having an earned Master's degree, it could be estimated that the annual faculty need to fill retirements over the next five years is 16-17 at both the Master's and doctoral level. At this point, Connecticut graduates sufficient numbers of Master's-prepared nurses to qualify for AS/BSN teaching faculty positions; however, as stated previously, there is no correlation between that number and the number who may have an interest in becoming nursing faculty. For the doctoral faculty slots, with only an average of 13 graduates per year, it is clear that the need outstrips the supply from Connecticut schools. These demand figures do not include any increases associated with program expansions recommended in this document.

Because of its long history and the systematized development of an educational career ladder from diploma and AS degree programs on through to the doctorate, the Nursing profession is one of the easier allied health professions to study. Their professional educator organization collects and publishes validated statistics on their members and disseminates the results widely. Because many of the other careers in allied health are relatively new, they have not had time as a profession to reach the same level as Nursing. In the section on program specifics, Nursing plus four other careers are examined, in light of the programs within Connecticut. To show the relationship between programs, graduates and career pathways within the state, Appendix 2 presents allied health careers that have direct patient contact, with their corresponding number of programs and 2006 graduates within Connecticut.

In terms of capacity to produce Master's prepared faculty, nine (9) of the 16 listed disciplines have no corresponding Master's or Ph.D. programs within the state. More specifically, the Bachelor's degree is the highest available degree for the following fields:

- Dental Hygiene
- Radiologic Technologist
- Radiation Therapist
- Respiratory Care
- Cardiovascular Technologist
- Diagnostic Medical Sonography
- Therapeutic Recreation
- Nuclear Medicine Technologist

(NOTE: As of 2007, an M.S. degree in Nuclear Medicine Practitioner (advanced practice) will be offered at two universities in the U.S.)

The remaining programs, with the exception of the LPN program, offer at least a Master's degree, with doctorates being offered in Nursing, Physical Therapy, and Audiology. For the careers that do not go beyond a Bachelor's degree, the alternative for those desiring to teach must be to obtain a Master's degree in some other area of allied health. One program director of Radiography reported that since there are no Master's programs in that field, students wishing to continue their education above the Bachelor's level will enroll in Master's programs in business or a healthcare management related field. Some who are interested in teaching may pursue a Masters in Education. Both Radiation Therapy and Nuclear Medicine Technology report that most of their professionals who go

on to a higher degree target a Master's degree in Health Administration, Business Administration or Education.

Within the allied health career spectrum, entry level education in at least two career areas is being increased. These degrees must be completed prior to the student taking the licensure exam, permitting practice within the state. By 2010, entry level for a Physical Therapist is expected to be at the clinical doctorate level, while in 2007 entry level Occupational Therapists must complete a Master's degree. Other fields are considering similar increases

Turning the focus slightly, let's examine faculty in terms of the numbers needed to support existing programs and their expansion. For the field of Nursing, the entry level AS and BS programs are at capacity, so any new numbers of graduates must come through either program expansion or student retention efforts. Other allied health programs within the state are not at student capacity and therefore the need for hiring additional qualified faculty is not as great. Table 9 reports on an array of programs, the allotted student slots for the program at those institutions, and their graduation numbers for the past three years. Graduation figures alone do not reflect number of "seats" filled in classes, but can be a predictor of the success and viability of the program.

Program of Study	Student Capacity	'04 Grads	'05 Grads	'06 Grads	3 Year Avg. %
Dental Hygiene: AS (Tunxis CC)	36	27 / 75%	33 / 92%	32 / 89%	85%
Dental Hygiene: AS/BS (Univ. of Bridgeport)	48	24 / 50%	41 / 85%	49 / 102%	79%
Diagnostic Medical Sonography (Gateway CC)	12	15 / 125%	9 / 75%	9 / 75%	92%
EMT/Paramedic: AS (Capital CC)	20	2 / 10%	7 / 35%	2 / 10%	18%
Nuclear Medicine Technology (Gateway CC)	14	17 / 121%	10 / 71%	8 / 57%	83%
Physician Assistant: MS (Quinnipiac Univ.)	85	49 / 58%	49 / 58%	49 / 58%	58%
Radiation Therapy: AS (Gateway CC)	14	7 / 50%	5 / 36%	5 / 36%	40%
Radiography: AS (Gateway CC)	25	15 / 60%	24 / 96%	20 / 80%	79%
Respiratory Care/Therapy: AS (Naugatuck CC)	20	11 / 55%	7 / 35%	9 / 45%	45%
Surgical Technology: AS (Manchester CC)	24	11 / 46%	14 / 58%	18 / 75%	60%

Table 8 – Programs with Allocated Student Cohort Capacity and recent Graduation Data

An approximation of the number of faculty needed to support the above programs can be drawn from the size of the student cohort (capacity). The larger the capacity, the more faculty that would be needed to deliver the didactic and clinical classes. The programs with cohorts under 25 students are all run by 1 or two full-time faculty and one or more part time clinical faculty.

Laboratory Facilities on Campus

When examining the factors that limit program expansion in any allied health field, having sufficient laboratory facilities on campus is clearly a concern among the program directors interviewed. Two interview questions were asked regarding facilities:

- Are your current lab facilities, including equipment, adequate?
- Are your lab facilities able to accommodate program expansion?

Of the 23 responses, ten (10) felt their current labs were not adequate (i.e., Univ. of Bridgeport – Dental Hygiene, Tunxis Community College – Dental Hygiene, Gateway Community College–

Diagnostic Medical Sonography, Radiation Therapy, Radiography, Capital Community College – EMT/Paramedic, Norwalk Community College– Medical Assistant, and all allied health programs offered through Extended Studies, Housatonic Community College– Clinical Laboratory Technician, Platt Technical High School Adult Education --Medical Assistant) while 13 reported adequate facilities. Some of the negative responses included comments on having to share lab facilities with other disciplines, having little to no storage space for equipment, having outdated equipment, and lacking equipment that students would need to use in a professional setting. Related to lab facilities are the rooms used for the didactic portion of studies. Here, too, comments were made about scheduling problems, being bumped from lecture rooms by other classes, and having the lab, lecture, and office space combined into one classroom.

When asked about lab facilities being available if program expansion was mandated, 18 respondents said that they would need additional lab space and the equipment to support it. Only four (4) respondents indicated that they would have adequate lab space available to them, or that their programs are structured so as to use other (non-college) lab facilities. For instance, one Dental Hygiene program conducts their labs at a clinic in the evenings when no clientele are scheduled.

Another program is structured so that all the hands-on learning is relegated to the clinical year, spent in an acute care facility, negating the need for a school lab. A third school has graciously been given lab space at a partner hospital. However, the hospital is now feeling the pinch to use the lab space, and the lab may become unavailable to the school's program, especially since a change in hospital administration is in the offing. Many interviewees reported that their programs have been supported through personal relationships that have built up over the years. Retirements and transfers can impact business relationship as new leadership, with new ideas and directions, takes over the management. At a minimum, it means rebuilding the relationships so that preexisting formal and informal arrangements between the hospitals and educational programs can continue.

A final comment on creating additional lab space to accommodate program expansion needs to be made. For any school to take a classroom "offline", convert it to a lab and dedicate it to the use of one or more programs is not an easy undertaking. While it is true that, at many institutions, classroom utilization could be better managed through the restructuring of class time delivery, it is just as true that each school has tens of programs all vying for prime-time classrooms. Taking one room offline decreases the number of available 90-minute class schedule blocks per week by a minimum of16 and a maximum of around 27 (e.g., eight scheduling blocks each per Mon/Wed and Tues/Thurs delivery; add another 8 for Friday/Saturday-scheduled classes, and another 3 for Sunday utilization). The problem of room conversion increases when looked at in terms of revenue flow. More revenue can be generated if the room is used to hold lecture classes, filled with up to 30 students than if it is used for a 20-student cohort for lab work. While all students who are taking lab courses typically pay an additional fee, neither does that fee cover the increased facilities costs nor does it close the gap associated with the lost revenue from lecture-only seats. Institutions trying to meet their revenue goals will have a difficult time justifying the conversion of a classroom to lab, even in the face of program expansion in an area in which the State needs more educated professionals.

Clinical Placement Facilities

The availability of clinical placement facilities is a critical factor in the viability of most of the allied health programs. Although there is an Allied Health Workforce Policy Board study dealing solely with clinical placements currently underway, this study will comment on the problems cited by interviewees in this area. Problems with clinical placements that would impact program expansion include:

- availability of sites
- capacity (number of students that the facility is willing to handle/supervise)
- payment vs. non-payment for services
- availability of preceptors or clinical faculty
- contract administration

For many programs, the availability of sites within Connecticut is small, and geographically disbursed, introducing an added hardship for students who must drive miles to their clinical site. While Nursing students can be placed at any hospital and clinic that is willing to act as a clinical site, other disciplines such as Diagnostic Medical Sonography, Radiation Therapy, and Radiography must find facilities that house those particular services. As an extreme case, UCONN currently has contracts with 270 organizations which theoretically could provide the program with around 500 different clinical rotations for students. PT students nationwide compete for these placements, and bear the additional costs associated with residency. As a direct outcome of not being able to find clinical sites, one interviewee reported that while waiting lists were high for her Phlebotomy courses, only one class of 12 students could be run per semester.

The number of student interns that can be assigned to a clinical rotation in a facility varies widely among allied health careers. A program's capacity is directly related to the number of students that can be placed during their mandatory clinical experience. Table 10 lists some examples.

Program	Student-Faculty Clinical Ratio
Nursing	10:1
Dental Hygiene	6:1
Respiratory Care (dependent on rotation)	3:1 or 5:1
EMT/Paramedic (dependent on rotation)	2:1 or 3:1
Physician Assistant (dependent on rotation)	2:1 or 3:1
Medical Assisting	1:1
Radiation Therapy	1:1

Table 9– Clinical Placements – Student/Faculty Ratios

This capacity issue is compounded by the fact that there is competition among the allied health programs for placements. For example, Physician Assistant students compete with foreign medical students who pay for placements, EMT/Paramedics compete with Respiratory Therapy and RN students, and BS students compete with AS students. In all fairness, it must be mentioned that the scheduling of the clinical placements, where the majority of nursing programs are trying to place all their students in the same limited number of rotation slots (e.g., OB/Gyn, Pediatrics, and Emergency) exacerbates the problem of limited clinical placement sites. One university revised their

clinical schedule and thus alleviated their problem of not being able to find sufficient OB/Gyn and Pediatric rotations for their students. Moving to a staggered admissions/program start date would also provide some relief.

The issue of payment versus non-payment to medical facilities or their staff who participate in clinical supervision of students is becoming more of a problem for State-supported institutions as a number of private schools now offer compensation either to the facility or to the staff of the clinical site. At least two schools reported being asked by institutions whether or not they would be offering monetary compensation to the clinical facility while another school stated that they have lost at least one clinical site, where the intern positions were given to a private school which had the funds to augment clinical preceptor's salaries. As stated above, economics is a potent factor in any business. Coupled with the high demand/low availability condition of clinical sites, this is an issue for which an equitable solution is needed immediately.

When it comes to supervision of students, allied health programs vary between using their own clinical faculty (full-time or part-time) and using hospital/clinic personnel as preceptors. Just as full-time faculty members are in short supply in many fields, the same is true of finding qualified clinical faculty. Where staff members are used as preceptors, some institutions (but not all) relieve the staff person of some of their normal duties so as to function as a preceptor. This quickly becomes related to the issue of payment/non-payment for service. While many professionals have a desire to "give back" to their profession, to agree to take on more work for no additional pay is a hard-sell when looking to recruit preceptors.

Program directors listed contract administration of clinical sites as one of their most time-consuming activities. Multiple directors at State schools reported needing up to nine months to shepherd a contract thought the State system. If being agile and reactive is a necessary attribute of being able to secure clinical sites, then the current contract process works against it. Several interviewees suggested that having a streamlined clinical site contract process would be of major assistance.

Clearly, the above issues are having a large impact on existing allied health programs. Any hope of program expansion can be easily eliminated by having insufficient clinical placement sites for program students, whatever the reason.

Student Retention

While the large numbers of students being turned away from entry level nursing programs have been well documented, the same cannot be said for all allied health programs. Student populations for the spectrum of programs varied across fields and among like programs at sister schools. However, one thing was found to be true for all programs: student dropout rates range anywhere from 20 to as high as 50 percent. On closer examination of schools with low student failure rates, the most influential factor for student success seems to be the existence of student support services, including mentoring, tutoring (specific to discipline as opposed to generic), lab assistants, and study groups. If those services are available, and the program exhibits a supportive culture, then retention figures rise to the 80-90% range. Acknowledging the upfront investment in these typically expensive allied health programs, it would seem logical to make an investment in these student services, rather than lose up to half the student population. The entering or freshman year group, which can be the most vulnerable to failure for a multitude of reasons, will benefit from targeted retention efforts.

This issue of student retention is financially linked to the decision of whether or not to recommend program expansion. For instance, in Connecticut in entry level nursing programs alone, over 300 students wash out of the program annually (see Appendix 9). If program expansion efforts were made to graduate an additional 300 students per year, in faculty salary and fringe benefit costs alone it is estimated that an additional two million dollars would be needed annually. That calculation is based on hiring 18 full-time faculty members (8:1 ratio) at a salary of $54,000 plus 42% fringe benefits ($1,380,240) and additional 9 clinical instructors at an annual salary of $690,120. If clinical preceptors are used, costs would be reduced substantially. In comparison, in the State's Community College System, student tutors with a Master's degree are paid in a range of $20-25 per hour, and lab assistants receive $24/hour, or approximately $4,000 per semester. Part-time clinical instructors are paid approximately $44/hour. Financially, if a choice had to be made between adding faculty or student support services, it would make economic sense to utilize the full array of student support services and insure higher graduation rates, recapping on the investment of the entire program.

Program Highlights

The following section highlights five allied health programs that are offered at multiple schools in Connecticut. The additional depth of information on each of these programs brings out the changing nature of allied health and identifies some potential problems within each of these specific disciplines.

Dental Hygiene

Dental hygiene programs have existed in Connecticut since 1949, when the first school for dental hygiene in the world was opened at the University of Bridgeport. However, it was not until the 1980's that the profession started to push for a common educational program. Currently, there are over 3,300 licensed dental hygienists in Connecticut. The educational entry level for the profession is the Associate degree. While development of the profession has continued, in a recently published paper by the American Dental Hygienists' Association, the following issues were raised:

- the proliferation of new associate degree programs,
- the lack of incentive for completion of a Bachelor's degree versus an Associate degree,
- various educational levels for entry into the profession,
- shortage of appropriately educated dental hygiene faculty members,
- lack of a universal plan for the various levels of dental hygiene education,
- lack of control over accreditation standards for dental hygiene education by the dental hygiene profession,
- the threat of preceptorship (on-the-job training) or career tracks that do not require a formal accredited education.[xvi]

At present in Connecticut, there are four (4) Associate of Science programs in Dental Hygiene and three (3) Bachelor's programs, one of which is an online program. Between 2000 and 2006, the AS programs have been graduating upwards to 80 students, while the BS programs average 19 graduates per year, reflecting the concerns of the profession mentioned above. As to the numbers of AS graduates who are known to transfer to one of Connecticut's BS programs, one program director at a 4-year institution reported that clearly 20% of her students already possessed an Associate in Science degree. Another school that awards AS degrees reported that 80% of their incoming cohort typically had already completed two to four years of college in another field, and in some cases had

earned an AS or BS. In general, not only are allied health students older than the 18-yr old college freshman population, but many have substantial job experience in a related field and/or have already earned a college degree. Currently, there are no MS programs in Dental Hygiene within the state, although the University of Bridgeport will be filing their application shortly. When approved, this will be the only Master's in Dental Hygiene program in the Northeast, the closest one being in West Virginia.

The DOL reports annual job openings of 88 per year, which the current level of graduates adequately fills. Program expansion at the entry level does not seem to be warranted. However, the planned Master's program will be a benefit to not only the State but the entire Northeast region of the country, and will provide the pool of qualified faculty needed for all the State's programs.

In a related area, 12 programs in Dental Assisting exist at various Connecticut institutes. However, most of these programs are non-degree. No career ladder exists between Dental Assisting and Dental Hygienist. Even at the one school that offers both programs, the course work for Dental Assisting does not transfer into the Dental Hygienist program, although the core liberal arts courses would transfer. Of the 180+ annual reported graduates of the Dental Assisting programs, the number of those who then go on to an AS or BS program is unknown.

Occupational Therapy (OT)

Occupational therapy is one of several career fields in which the educational entry level has been raised. Prior to 2007, the entry level for an Occupational Therapist was at the Bachelor's level. Starting in 2007, a Master's in OT will be required prior to taking the national certification exam.[xvii] Currently, there are over 1,700 licensed Occupational Therapists in Connecticut. In terms of job outlook, the DOL reports current annual job openings of 42, compared with the 32 graduates produced at Connecticut schools (both BS and MS). According to those numbers, the current level of graduates is neither sufficient to fill current nor future job levels within the State. However, given the changes in graduate programs within the state, they are on the track to producing sufficient graduates.

In 2004, Connecticut had two colleges which offered Bachelor of Science programs in OT. Both these programs have been discontinued or replaced by a Master's in OT. Currently, there are two colleges within the state that offer Master's in OT degrees. Their combined graduation rates have ranged from 8 to 15 graduates for academic years 2003 through 2005, but produced a sharp spike of 38 grads in 2006. This reflects the transition from BS to MOT entry level for the profession. It is expected that the upwards trend in graduates will continue.

It should be noted that the move to an MS entry level for the profession is expected to further exacerbate the faculty shortage. Currently, there are only 13 doctoral programs in the nation, with an additional 153 Master's programs. Many of the BS programs have been closed or combined with MS programs. Additionally, the terminal degree is a clinical doctorate, not a Ph.D., and is not accepted at many universities for tenure track faculty positions. Furthermore, the focus of these programs is to turn out practitioners, not educators. Since Master's programs will be seeking doctorally-prepared Occupational Therapists for their faculty positions, and since there are only just over a dozen doctoral OT programs within the US, the development of a doctoral program in Connecticut might be an opportunity to be explored.

Related to Occupational Therapy is the field of Occupational Therapist Assistant (OTA). As with Dental Assisting, there is no clear career path from OTA to Occupational Therapist. In Connecticut, three Associate degree programs in OTA exist, graduating between 15 and 20 students a year. The DOL reports a current annual job need of 10, which is filled by the current level of program graduates within Connecticut schools.

Physical Therapy

The original Bachelor of Science program in Physical Therapy in Connecticut was licensed and accredited in 1979 at UCONN. Since that time, Master's in Physical Therapy and most recently a Doctorate of Physical Therapy were added. The profession has changed from a BS-entry level to MSPT, and now to the new Doctorate in Physical Therapy (DPT). The higher entry level has also had the effect of placing institutions in the position of closing their Physical Therapy programs. The University of Hartford has closed their BS program. Quinnipiac University and Sacred Heart University have closed their MS/MPT/MST programs, but have recently opened DPT programs.

While those practitioners who hold MSPT degrees will not be affected by the higher entry level that will soon take effect, it remains to be seen just how many students will be willing to continue their education for an additional 3-5 years to complete the doctoral studies. For the past five years, Quinnipiac and Sacred Heart, alone, were averaging over 110 MPT graduates annually. Now that those programs are closed, it is unclear whether the doctoral programs will attract and graduate sufficient students to match the DOL's projected annual need of 111.

In terms of the student clinical assignments within the program, there are an insufficient number of quality clinical sites available nationwide in which to place students from the 209 accredited programs in PT. For instance, UCONN currently has contracts with 270 organizations which theoretically could provide the program with around 500 different clinical rotations for students. Students must complete three separate clinical rotations in acute care, orthopedic, and neuron/rehabilitation within their program of study. Because many of these sites are outside of Connecticut, the problem arises that many students elect to relocate permanently in these areas, rather than return to Connecticut. It would be prudent for Connecticut to explore the development of additional clinical PT sites to handle each of the three clinical rotations within its boundaries in order to stem the "brain-drain" that is caused by these out-of-state clinical placements.

Associated with Physical Therapy is the lower level Physical Therapy Assistant (PTA) career track. Although this Associate degree level program is offered at six community colleges within the State, the career itself has been described as a dead-end job. No career ladder exists between PTA and PT. Courses do not transfer since the science requirements are much less rigorous at the AS level. Students basically have to start all over if they want to enter the PT track. Cumulatively, the six schools have not graduated more than nine (9) PTA students annually.

In interviews with practicing Physical Therapists, most stated that they have no interest in using PTAs, but thought that the larger PT facilities might make use of them. Since the sample size for these interviews was small, it is recommended that the colleges that offer the PTA program research their communities to see if the program can remain viable. While the DOL lists an annual job demand of 30 positions, the changes within the industry may make this job obsolete.

Respiratory Care

Respiratory Care is one of the allied health careers currently experiencing significant growth. Professionals are found now not just in hospitals, but in increasing numbers in long term care facilities, sleep labs, medical arts facilities, and pharmaceutical companies. Currently, there are four entry level AS programs and two BS programs, one of which is slated for closure. The AS programs have been graduating between 12 and 24 students annually for the past six years. Equal numbers of graduates have been coming out of the BS programs. The cumulative number of graduates does not equal the DOL annual job demand of 58 for this career. Currently, there are no MS programs in the state, with the closest being at Northeastern University in Boston.

Both at the AS and BS levels, directors of Respiratory Care programs have stated that finding clinical sites is their biggest challenge. Clinical ratios are 1:3 or 1:4 in the ICU and 1:5 on general floors. Both programs utilize preceptors when part-time instructors are not available to handle the clinical supervision. Private schools offer remuneration either to the facility or directly to the clinical preceptor. As with other allied health careers, finding faculty is difficult, particularly since there are so few MS programs in Respiratory Care in the country. Most faculty members have their Master's in Education, a science, or Public Health.

Student retention was listed as a major issue within the program. In order to attack part of the retention issue, Naugatuck Valley Community College revamped their program entrance criteria and now demand successful completion of Biology 101 and English 101, plus a readiness for Intermediate Algebra prior to application to the program. Entering students are now better prepared academically, but unfortunately there is no funding for program counselors or tutors to offer assistance to students in the program.

Marketing of these programs is also an issue. It was stated that this career is not well known to high school students, unless someone has a family member with a breathing disorder or other direct contact with a respiratory care professional. Directors stated that they work with Area Health Education Centers (AHECs) to spread the word about this career, and as time permits, market their programs directly to middle school populations. While some Respiratory Care programs within the State are at capacity, others have room for additional students. A concerted marketing effort would help funnel students into this field.

One final note: This is one career where, after a few years in the profession, practitioners move on to other fields, most notable those of case management or Physician Assistant. So, even when graduation numbers rise to the point of filling annual job openings, there will always be attrition in the ranks with which to contend.

Nursing

Within Connecticut, the following nursing programs are active: 1 diploma program, 8 Associate, 13 Bachelor's, 5 Graduate certificates, 14 Master's, and 2 Doctoral programs. Table 10 indicates geographic distribution within the state. The 14 Master's advanced practice and specialty programs are distributed among 10 schools, two of which focus on Nursing Education.

The field of nursing is the most well-established of the existing allied health programs within the State. Currently, there are over 51,000 licensed RNs and an additional 2,000+ retired RNs with active licenses in Connecticut. In terms of supply and demand figures, Table 11 combines the data for nursing and the related fields of Licensed Practical Nurse (LPN), Patient Care Assistants and certified nurse aides. While graduation data on certified nurse aides have not been provided to the DOL for all programs or in a consistent manner, demand data indicates that this area produces more graduates than current demand. LPN graduations, which run in an 18 month cycle, also produce adequate graduates, when the graduations are averaged over a 2-year period.

The distribution of entry level programs leaves two large portions of the State minimally covered. The northwest corner of the state (i.e., north of Waterbury, west of Hartford) is without an entry level RN program. The southeastern portion of the state is served only by the AS program at Three Rivers Community College in Norwich.

It is suggested that the demographics on place of residence obtained from applications to nursing schools could be examined to discover how many applicants come from those regions of the State which have no RN program. If a qualified student body exists, then program creation, full or feeder-programs to nearby RN programs, may be warranted in those area.

Program Code	Program Title	DOL Cluster		Educational Entry Level	2004 Grads	2005 Grads	2006 Grads	Demand 2004-2014
511613	Licensed Practical Nurse[5]	1902		Post-secondary Voc. Training	165	514	181	294
511614	Certified Nurse's Aide/ Patient Care Ass't[2]	3103		Short-term OJT Training	2031	6122	2031	1206
511601[3]	Registered Nurse	1313		Diploma RN programs	92	104	103	
511601	Registered Nurse	1313		Associate Degree	277	354	510	
511601	Registered Nurse	1313		Bachelor Degree	428	485	544	
511601	Registered Nurse	1313		Master Degree	22	23	22	
				Total: [3]	**819**	**966**	**1179**	1081
511602	Nursing Administration (MSN/MS/Phd)	1402		Master Degree	122	154	230	unspecified
511603	Adult Health Nursing	1313		Master Degree	16	4	13	unspecified
511604	Nurse Anesthetist	1313		Master Degree	30	31	28	unspecified
511605	Family Nurse Practitioner	1313		Grad Cert or Work Exp + B.A.	14	11	7	unspecified
511608	Nursing Science, PhD.	1313		Doctoral Degree	16	5	16	16
511611	Community/Public Health Nursing	1313		Master Degree	0	0	0	unspecified
511699	Nursing / RN to BSN Completion Program	1313		Bachelor Degree (6th yr cert.)	68	78	0	unspecified
				Total:	**266**	**283**	**294**	

NOTE 1: These figures represent nurses graduated from CT schools only. Graduation statistics for Connecticut-resident nurses who complete online programs from out-of-state institutions are not included here.

NOTE 2: 2006 Graduation numbers are incomplete for Nursing Assistant/Patient Care Ass't programs, with not all programs reporting.

NOTE 3: The total for Program 511601 – Registered Nurse - is not equivalent to the number of "new" RNs. CCSU and UofH BSN graduation data comes from programs where all students are already RNs. Fairfield, Sacred Heart, and Yale also have RN completion programs, but the number of first-time-RN grads is combined with other nursing program grads.
In 2005, 98 of the 485 BSN graduates, or 20%, were already RNs
Best Estimate of New Nurses in 2004= 316 BSN+ 277 AS + 92 diploma programs = 685
Best Estimate of New Nurses in 2005= 327 BSN+ 354 AS + 104 diploma programs = 795
Best Estimate of New Nurses in 2006= 460 BSN+ 495 AS + 103 diploma programs = 1,053

NOTE 4: According to DPH data, for the 2004 and 2005 graduating classes for entry nursing students, attrition rates have ranged from 20% to 36% or roughly 300- 330 students (See Appendix 9)
NOTE 5: LPN programs at CT Tech High School Adult Education programs are 18 months in length. The 18 grads for 2006 were from the evening Middletown program. In January, 2007, a new class of 320 LPN graduates is expected.

Table 10 – Nursing Demand-Supply Data (Sources: DOL and DHE) All Specialties

Problems with staffing, facilities and clinical placements were described earlier and affect all the programs to varying degrees. Of interest are the business relationships that individual colleges have forged to overcome some of those problems. Norwalk Community College and three area hospitals (Greenwich, Stamford, and Norwalk) signed a formal Letter of Agreement with the goal of increasing the number of nursing students over a three year period by up to 36 students annually. The hospitals committed funds that would pay for three new full-time nursing faculty members, and agreed to make adequate clinical facilities available to student interns. NCC agreed to implement an evening nursing program, hire the faculty, purchase additional technology/equipment to support the expanded program, expand existing lab hours, hire a full-time nurse counselor, and implement strategies to channel NCC nursing graduates towards jobs at the three hospitals. The hospitals and the college all consider the partnership a success.

Along the same lines, Fairfield University has developed partnerships with an area long term care facility and a local hospital, both of which fund a ½ time faculty position. They have also developed relationships with two hospitals to ensure release time for MS-prepared nurses who supervise clinical students. In order to attract and retain high quality faculty, Fairfield's leadership has developed summer work/research abroad opportunities in two European cities. The goal is to create a stimulating work environment, supported by a visible commitment from the University.

Sacred Heart University has focused on developing a partnership with an area hospital in order to bring the college's BSN program into the hospital, making it easier for AS or Diploma-prepared nurses to pursue a degree. This partnership program found ways to eliminate some of the more common stumbling blocks in order to decrease potential failure. For instance, job schedules for the participating nurses were arranged one year in advance so that the hospital's work needs could be met while allowing the nurses sufficient time for classes. Additionally, the college and hospital worked together to come up with a payroll deduction plan, to help make the course costs easier to handle. The hospital contributed some of their facility time as well. To date, three cohorts of students have graduated from this program.

Three Rivers Community College developed a business partnership with a local hospital to attack the student retention problem within the program. The resulting support system for laboratory personnel and the systematic student referral system has resulted in a 20% increase in graduates in the '04-'05 academic year. In another program, the college assisted with the development of a clinical preceptor program, using BS-prepared nurses in consort with MS faculty. This very successful program has trained 25 new clinical preceptors, decreasing the overall cost of faculty for the student internship period.

Western CT State University (WCSU) has a partnership with Danbury Hospital that allows a Master's prepared nurse on staff at the hospital to serve as a Visiting Assistant Professor in the Department of Nursing at WCSU. This partnership has allowed Western to admit 10 additional students to the BSN program annually.

The above mentioned programs are all solid examples of what can be achieved with well-designed programs and partnerships where both parties visibly benefit. Those heading up the programs clearly had a mission to solve a pressing problem and were able to bring the personnel together to work towards a successful outcome. The leadership of these efforts has been exemplary and the programs, replicable with modification where needed for local circumstances.

Over the past five years, problems affecting nursing education and programs to alleviate those problems have been developed and piloted. Also during that time, nursing programs across the State have expanded, taking in larger student cohorts. The number for 2006 for entry level RN graduates was nearly 1,060. This is up from 2005 figures of approximately 795. However, the current year withstanding, Connecticut has been producing less new nurses than the demand for multiple years. Figure 3 shows the nursing deficit over a three year period, from 2004 through 2006, calculated as the annual RN need (1081) minus the number of new RN graduates per year. This deficit of 720 nurses is echoed in the Connecticut Hospital Association number of 742.8 unfilled, FTE staff RN positions as the member hospitals entered 2006. If the shortage data for 2000 through 2003 were added to the 720, the size of the deficit would be substantially higher. What is needed is to query Connecticut Hospital Association for their 2007 staff openings data and see if the number is still in the 700 range. If so, then the increase in annual graduates has not eliminated the staff nurse shortage which seems to be carried forward from year to year.

The program expansion at Connecticut schools of nursing has moved the numbers of nursing graduates very close to the annual demand, but has not diminished the deficit condition. To eliminate the deficit, either additional programs will need to be expanded, or student retention within nursing cohorts will need to be increased.

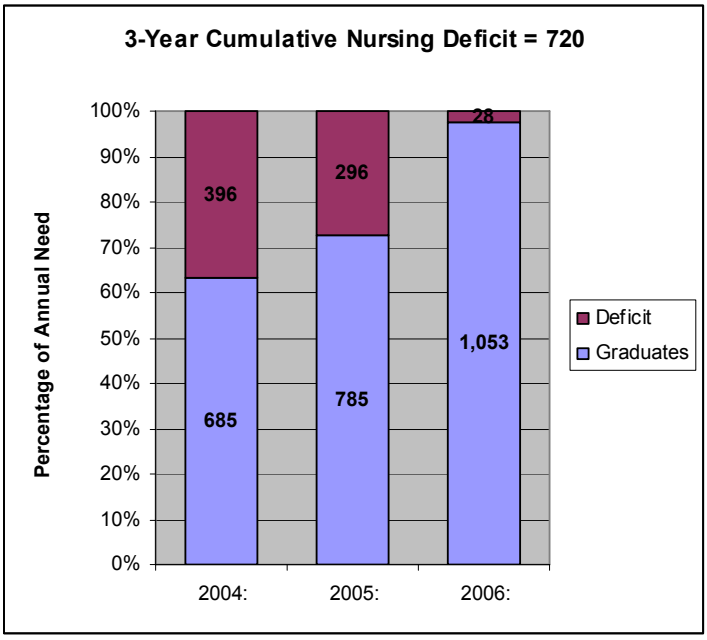

Figure 1 – Nursing Deficit in Connecticut

Because of the shortage of clinical sites, the struggle to find qualified faculty, and their recent expansions, nursing schools that produce entry level RNs are in a position where few can contemplate additional program expansion. However, all schools can focus efforts on student retention.

As can be seen from Appendix 9, the total of non-completers in nursing programs was 317 during 2004 and 322 during 2005. Retaining even 75% of these students would increase graduation numbers so that the RN deficit could be substantially reduced within three years.

As was mentioned previously, the costs associated with student retention activities are substantially lower than the cost of supporting faculty and facilities for a new cohort of students. For Connecticut schools, the less problematic path would be to duplicate the successful student retention programs which have already been piloted within the state. Aside from the obvious higher numbers of graduates, the State gets a better return on investment made in each of the students, specifically, and the programs in general.

The final issue to be discussed under Nursing is that of faculty retirements. The Connecticut League for Nursing reported in 2005 that 33 faculty members of nursing schools had indicated a decision to retire prior to 2008. The total of full-time nursing faculty across all schools and programs is approximately 184. A retirement of 33 faculty represents nearly 18% of the state-wide figure. When spread across the 19 schools and 34 programs, the number seems manageable. But retirements may not be spread evenly across schools. For a school with 10 faculty, a retirement of 2 faculty can cause severe impact on the program.

Nursing directors report that it takes at least two years to bring a new faculty member up to speed within the program. Given the problem of finding qualified nursing faculty, having multiple faculty members retire in one given year can bring a program to its knees. While it was mentioned previously that the number of MSN graduates is fairly large, those graduates have not been moving into Nursing Education in academic settings.

To formalize a program that would proactively produce replacement faculty for the anticipated 33 retiring instructors by 2008 at Connecticut nursing schools would be a wise thing for the State to do. Competition for faculty will remain tight across the United States. Attracting nurse educators to Connecticut will remain difficult, aggravated by the high cost of living, lower faculty wages compared to practitioner's pay, and shortage of affordable housing in various regions of the State. The Scholarship-for-Service (SFS) model of building a cadre of professionals to fill a need has been used successfully by several branches of the US government as well as private employers. That and other similar programs, that provide educational and financial incentives for teaching, could be used as a model to develop the supply of nurse educators that will be needed for the foreseeable future.

Miscellaneous Issues

At Risk Programs

Throughout this study, a number of issues came to light that impact the overall health of the allied health programs with the State. One of the most disturbing was the number of programs that are run by only one faculty person plus part-time clinical assistance. This one faculty person has to do everything, from marketing to hiring to contracts to student mentoring. In terms of risk, the program's viability is attached to that faculty person's continued employment. In light of the difficulty in finding qualified faculty, the risk to program continuance is even higher. It is recommended that individual schools identify those allied health programs supported by one faculty position and take measures to reduce the risk to the program when the faculty member resigns or retires.

Non-standard Clinical Education and Supervision

Another issue that needs attention is the number of programs where the clinical experience is supervised by a non-degreed practitioner with little or no educational delivery expertise or preparation. While the use of preceptors eliminates the problem of hiring clinical faculty, the risk of using less than optimally educated individuals is that students will not receive adequate or standardized instruction. While some programs have a fully laid-out educational program of study for the preceptor to follow, there are programs that have either only the barest of outlines for the clinical experience or none at all.

This may be an issue that needs to be addressed by the respective professional associations, but for quality control, the sponsoring Connecticut schools should take a hard look at the clinical portion of their programs, particularly those for which the Associate of Science is the terminal degree. For those careers where no standardized clinical experience exists, Connecticut schools may want to take a leadership position in developing one.

State-sponsored Adult Education Programs

The Adult Education allied health programs, operated by the Connecticut Technical High School System, are probably one of the best kept secrets in the State. These programs offer some of the most affordable programs in an array of careers within Connecticut.

The eleven (11) LPN programs graduate approximately 300 students every 18 months. Along with the LPN programs, Surgical Technologist, Dental Laboratory, Dental Assisting, Certified Nurse Assistant, and Medical Assisting programs are available. Clinical placements for these career programs also face the same challenges and competition for student internships. Student retention issues are also the same, with the director commenting that approximately 30% of the LPN students drop out during the 18 month program. These programs have no funding for student counselors or tutors.

The location of the facilities within technical high schools has contributed to the problem of program visibility. Since the profile of students in these adult education programs is that of the

working-adult (e.g., approximately 30 years old with a family), many seekers for allied health programs would never think to look for programs at a high school. Since there is virtually no marketing for these programs, and hence, no exposure except through their websites, the programs go "undiscovered". The LPN and CNA programs still have waiting lists for entrance, but the lists are getting shorter. Applicants state that they heard about the programs through word-of-mouth, or would not have known the programs were available. Within the technical high school facilities, programs have been moved to accommodate new high school programs, or have had their facilities reduced, limiting the size and frequency of the adult education classes that can be offered. Since the State is examining career ladders in allied health, it might be timely to explore stronger connections between the adult education programs and two and four year colleges and universities. Aligning these programs with their higher education counterparts would provide multiple benefits, including exposure to prospective students.

Utilization of Retired Nurses

One of the study's questions was to determine if retired nurses could be used within the Nursing programs, specifically as faculty, in light of the current difficulty in finding qualified instructors. While a survey instrument (see Appendix 11) was produced and distributed to a handful of retired nurses, other avenues of survey distribution were not successful. The responses from the completed surveys indicated an unwillingness to consider teaching either full or part time. If this issue is to be explored further, a mechanism for identifying and contacting retired nurses will need to be created. However, various directors of nursing programs were asked if they would consider using retired nurses as instructors and the response was very mixed. Some directors felt that, aside from having to possess an MSN, nurses retired for more than 2 or 3 years would already be out of touch with the current functioning in acute care facilities and medicine in particular. However, all directors did say that they would not hesitate to use retired nurses as lab instructors, tutors and mentors.

Shared Faculty

Within the study, the possibility of sharing faculty across programs was requested to be addressed. The simple answer is that this idea is easier said than done. College classes are scheduled based on program demands and course sequences. Full-time faculty must first be assigned to courses in the department into which they were hired. If classes for which they were scheduled do not fill and are subsequently cancelled, the full time faculty member must replace any scheduled adjunct instructors who have been given tentative class assignments.

For the faculty person who finds their assigned class cancelled, for which they have already prepared their semester, and then is assigned to a new class possibly one or two days prior to the start of the semester, the situation can be extremely stressful, but manageable if the newly assigned course is one they have taught before or for which they have current expertise. For those instructors unfortunate enough to receive a last minute class assignment in a subject where their knowledge is thin or out of date, the situation is not good for either them or their students. Taking this a step farther, a portion of the individuals interviewed for this study was asked whether faculty at their respective schools could be shared in any manner. The response was an overwhelming 'no', except for the most basic of classes. While the label of "allied health" lends a commonality to many programs, the programs and their studies are viewed by the faculty as being very distinct, overlapping little. There are also

accreditation issues that define who may teach courses in that major. So, having faculty within a school teach in areas outside of the one in which they were hired is not a viable option.

If the question of shared faculty is posed, focusing on sharing faculty among schools, then the answer changes. Through the use of technology (e.g., two-way, closed circuit broadcasts, web broadcasting technology) students can be physically located throughout the state, but tuned/logged in to the same class. In that way, one instructor can service many schools. While this technology exists and has been trialed between schools, the researcher has not been able to find instances of this being regularly utilized. Distance learning, otherwise known as online instruction, does exist for many of the allied health subjects, but does not include the interactive component. Drop-out and non-completer data for online programs, nationally, is estimated conservatively to be at the 40% level[xviii], making this a limited modality for delivering classes. For programs at State-supported colleges with individually low enrolled classes, this approach could work well. As in the case of the Physical Therapy Assistant program's consortia of schools at six of the community colleges, students would "attend" the shared class, but take all their general course requirements at their "home" school, from which the degree would be granted. Using this technology, faculty for the technology-delivered course would be shared. Depending on how the program is structured, a cost savings should be evident as well. (NOTE: The consortia arrangement for the Physical Therapy Assistant program demands that the students travel to Naugatuck Valley Community College for all PTA courses. As such, this does not qualify as an example of faculty sharing.)

Recommendations

Building Faculty Pipeline

As noted in the Board's 2006 Report, identification of staffing and infrastructure issues related to preparation, recruitment and retention of faculty for allied health programs in Connecticut is key to meeting the workforce needs of the health care industry in Connecticut. The following recommendations are intended to help meet that need.

Recommend: Implement a competitive Scholarship-for-Service model, where recipients agree up front to assume faculty positions after graduation.

Nearly every program within nursing and allied health is vulnerable to the current, or anticipated, faculty shortage problem. Where sufficient faculty exists, it is recognized that securing replacements will be difficult. It is therefore in the best interests of the State to create a proactive plan to develop instructor talent. The Scholarship-for-Service model has been used successfully in government and the armed forces to produce employees for areas of need. Typically, tuition is covered and stipends for living expenses are offered as well. If Connecticut were to launch such a program, it would receive the added benefit of retaining graduates, and the investment made in them, within the State. Since it will take 2-6 years to move faculty to the MS and/or Ph.D. level, it is imperative that faculty development efforts be initiated as soon as possible. Faculty from unique programs, from programs producing insufficient graduates for labor demand, and from those programs where finding qualified faculty is an issue should be targeted for faculty replenishment programs. Specifically, these include Nursing, Cardiovascular Technician, Cardiovascular Perfusionist, Dental Laboratory Technician, Nuclear Medicine Technologist, Respiratory Care Therapist, and Surgical Technologist.

Recommend: Support for proposed Master's in Dental Hygiene program by the University of Bridgeport.

The University of Bridgeport will be submitting their application for accreditation and licensure for a Master's level program in Dental Hygiene. This leadership position is laudable and is worthy of approval and support. This program will enable Connecticut to produce graduates who would have the academic credentials to serve as faculty at the State's six existing undergraduate programs, and make Connecticut the only state in the Northeast to offer the MS in Dental Hygiene.

Recommend: Conduct a feasibility study for developing Bachelor's and Master's programs for identified careers.

Eight careers were identified for which the highest level of study is currently the Bachelor's degree. The suggestion is made to study the feasibility of Connecticut schools taking a leadership position within their specialties to develop Master's level programs for the following careers: Radiologic Technologist, Respiratory Care, Cardiovascular Technologist, Surgical Technologist, Therapeutic Recreation, and Nuclear Medicine Technologist. If these programs included courses aimed at producing educators, then the graduates would be well prepared to assume college faculty positions. Bachelor's programs of study for the fields of Surgical Technologist and Nuclear Medicine Technologist warrant further examination, and offer additional areas where Connecticut schools can take a leadership position.

Recommend: Conduct a feasibility study for developing doctoral program in Occupational Therapy.

The Occupational Therapy profession, as of January 2007, has elevated the entry-level education for Occupational Therapists to the Master's level. While Connecticut institutions have adjusted their programs to accommodate this shift, there is a looming opportunity that the State should consider. Master's level programs in OT will need doctorally-prepared faculty to staff the programs in the near-term. While Master's prepared instructors are acceptable, the general tendency of schools is to hire at the doctoral level. Since there are only 13 colleges within the United States that offer clinical doctorates in OT, and since the desire for hiring those possessing doctorates in OT will be on the rise, the timing may be right to determine whether or not any of Connecticut's schools has the capacity to develop a doctoral program. This opportunity will last only until there are sufficient doctoral programs within the US.

Student Recruitment and Retention

The Board has also identified the need to recruit, train and support new students in allied health fields. In addition, attention must be paid to supporting those individuals who are currently enrolled in allied health courses throughout the state.

Recommend: Earmark funding for student support services in targeted programs.

Recapturing students who would be otherwise lost to programs because of academic failures will add to the graduation rates without having to incur additional teaching faculty or facilities costs. Sufficient studies have shown that tutoring and counseling services directly impact student program completion. Since most of the programs surveyed indicated that no funding for program-specific student services exists, and since pilot programs have already generated positive outcomes, it is recommended that funding be made available for targeted student assistance in selected nursing and allied health programs. Retention goals can vary according to disciplines, but a figure of 80% could be used as criteria for selecting programs that are falling below this rate to receive targeted retention resources. Cost savings will be directly proportional to the percent increase in retained students.

Recommend: Utilize retired practitioners in student support roles.

It is recommended that solutions for adding student support services explore using retired nurses, doctors, and other allied health professionals, rather than generic counselors. Nursing and allied health students will benefit most from assistance that is offered by a trained professional. Familiarity with medical terminology, knowledge of current practices, and experience in the workplace all factor into a well-structured support experience for the student.

Recommend: Initiate a statewide marketing campaign for allied health programs.

Connecticut has a need for well-trained allied health professionals. While many career programs exist within the State, some of those programs and careers go virtually unnoticed by the citizenry. Awareness campaigns, coupled with information on the location of educational programs within communities would assist many programs and begin to fill vacant seats in courses. Since many of

the programs report their students as being older adults, any marketing campaigns should target that demographic, particularly those currently in entry level health care jobs.

Areas for Further Study by the Allied Health Workforce Policy Board

Over the course of the next year, the Allied Health Workforce Policy Board will convene the appropriate stakeholders to examine the following suggestions. After thorough deliberations, the AHWPB will make both administrative and legislative recommendations to address key challenges to the development and support of the allied health workforce pipeline.

Improving Data Reporting and Collection

- The completion of the development and implementation of the Department of Public Health's online allied health workforce data collection system of all licensed individuals working in allied health fields is critical to the state's workforce planning.

- Explore expansion of data reporting and collection responsibilities for those allied health programs currently not required to provide completion, certification or licensing data for their students.

- The AHWPB must continue to collect and analyze data particularly as it relates to the state's investment in workforce initiatives. Dedicated resources and sustained research and analysis should be identified and secured in order to determine the effectiveness of these interventions and possible opportunities for replication.

Potential Program Expansion and Realignment

- **Consider adding one or two additional nursing programs.**

  While the Connecticut schools of nursing are now close to producing RNs at DOL's target level, the reality is that not all graduating nurses 1.) pass the NCLEX, 2.) works at an acute care facility, or 3.) desire to work full-time or, 4.) stay in the state after graduation. It would be prudent for the State to be producing RNs above the level indicated by the DOL, particularly in the face of the existing backlog of unfilled positions. Program expansion need not impact facilities. In particular, the evidence from Gateway Community College and Norwalk Community College indicates that finding the clinical faculty for evening assignments, while difficult, was not impossible. Hospital staff taking on those part-time duties within the evening programs does not have to leave their day job, nor do they have to take a cut in pay to function as a faculty member. The same would be true of students who have a financial responsibility to provide support for their families. They would have the opportunity to pursue a nursing career while meeting their other obligations during the day.

- **Determining if the underserved regions of the State could support additional RN programs.**

  Currently there are two regions of the state that are fairly devoid of local allied health and nursing programs. This includes the eastern third of Connecticut and the region north and west

of Waterbury. It is suggested that the 'place of residence' demographics, obtained from applications to nursing schools could be examined to discover how many applicants come from those regions of the State that have no RN program. If a qualified student body exists, then program creation or full- or feeder-programs to nearby RN programs, may be warranted in those areas. This idea could also be extended to other allied health programs that produce an insufficient supply of graduates.

- **Examination of the educational levels of allied health programs, carrying out realignment, where necessary.**

  The breadth of allied health programs in CT currently addresses the State's program need, but program depth needs to be examined both for essential educational degree levels within each profession and for the number of existing programs. Some programs exist at multiple schools, but produce few graduates. Other programs, especially those that are unique within the State are at risk because they are supported by only one full-time faculty member. Still other programs produce an over-supply of graduates. It would be prudent, after examining such factors as the number of programs, geographic location, modality of delivery, and number of graduates, to identify which programs should be eliminated, duplicated in another sector of the State, or expanded to a higher academic level. While an admittedly difficult task, albeit a common practice in the business world, it is necessary if the goal is to produce a sufficient number of nursing and allied health professionals for State needs, both now and in the future.

- **Establishing stronger system-to-system articulations with the CT Technical High Schools' State-funded Adult Education Allied Health programs and career ladder opportunities at two and four year institutions.**

  The allied heath programs currently located in technical high schools throughout the State would benefit from a stronger academic linkage to higher educational institutions. Career ladders should be more clearly aligned with college-level program requirements or prerequisites. The potential for facilities and personnel sharing exists as well. Allied Health courses are already managed by the Extended Studies (continuing education) divisions at community colleges, so the infrastructure exists to articulate with these additional programs.

Changes to Academic Programs

- **Consider change in Nursing and Licensed Practical Nurse (LPN) program model to staggered entrance.**

  Currently all but one or two nursing programs maintain the same cycle of beginning in September and graduating their students two years later in May. This produces a huge number of graduates only one time a year. The 18-month LPN programs also share the same approximate start and end dates. However, hospitals and other employers of RNs and LPNs have positions to fill during the other eleven months as well. It would be in the best interest of the State and potential employers if the nursing and LPN schools were to take in multiple cohorts of students, with entrance staggered through out the year. This should have an additional, positive impact on the problem of finding adequate clinical sites as well as on supplying the marketplace with

graduates throughout the year. Consideration of this change should be made in collaboration with employers who are currently impacted by the graduation cycle.

- **For programs offered at multiple schools, but suffering from low enrollments, explore utilizing the consortia program model currently used for the Physical Therapy Assistant program.**

  It would be prudent for the State's community college system to identify Allied Health programs with consistently low enrollments at multiple campuses that could benefit from having one location that would offer the major courses within the discipline, with the remaining courses taken at the "home" institution. While not ideal in terms of the travel requirement placed on the students, courses would have a greater opportunity of filling, course cancellations should decrease, and costs should be minimized. If a travel hardship is placed on students for these high-need careers, then a mechanism for providing transportation assistance could eliminate potential student drop-out due to lack of transportation.

- **Exploration of the use of bi-directional broadcast technology for delivery of didactic courses.**

  While online courses have the potential of reaching geographically disbursed populations, that solution for course delivery comes with a high dropout rate, typically linked to the one-directional nature of the courses and lack of direct instructor contact. Technology currently exists via the educational broadcast network or Internet that enables the students to interact in real time with their instructor and classmates. Since several colleges already have television production studios, it is recommended that this opportunity to offer "live" classes be explored. This could provide a solution similar to the one used for the Physical Therapy Assistant program, but eliminate the need for students to drive long distances to attend uniquely offered training.

- **Determine strategy or plan of action to take with unique programs.**

  Multiple unique allied health programs were identified in the study, two of which are categorized as having direct patient contact. These programs are at risk for closure due to the inability to find qualified faculty (as in the case of Cardiovascular Technician program at St. Vincent's College), the decline in enrollments to support the program, and the expense of maintaining the program. When these unique programs close, then Connecticut has no internal source for graduates of that career area. The State needs a strategy to proactively shore up the existing programs or a plan to duplicate the programs, thus eliminating the risks that accompany single programs.

Changes to Clinical Program

- **Consider expanding the use of clinical preceptors, in light of the problem with finding qualified clinical faculty.**

  Expanding on the pilot study undertaken at Three Rivers Community College, where Bachelor's-prepared RNs received training to take on the role of clinical preceptor, supervised by a

Master's-level RN, it is recommended that funding be earmarked for replication of the training portion of this successful program at the State's 2-year nursing programs. For sustainability, solutions should include 'quid pro quo' arrangements, such as making lab space available to hospital personnel for practice, prior to recertification exams. If the hospital is asked to release their staff from some of their duties in order to serve as preceptors, then they need to receive some service or facility usage of equal value. This will nullify the problem of perceived equity where some private institutions are remunerating the hospitals for clinical placements and use of preceptors, while State institutions can not offer monetary incentives.

- **Explore the possibility and economic potential associated with the development of a major Physical Therapy clinical training site within the State.**

  As mentioned in this report, for the field of Physical Therapy, there are not enough quality clinical placement sites to handle PT student clinical experiences. For instance, UCONN currently has contracts with 270 organizations which, on paper, provide close to 500 different clinical rotations for their students. These sites are located throughout the United States. PT students competitively apply to these sites for their clinical training. Many of Connecticut's PT students leave the State for their clinical training, and then do not return to Connecticut when they go into practice. This brain-drain works against the State. In order to reverse this trend, an additional PT site, serving all clinical rotations, would need to be developed within Connecticut to handle larger numbers of students from in-state schools. Recommendation is to explore this possibility, potentially linking it with expansion of other disciplines that also need expanded clinical sites.

- **Develop streamlined contracts process for obtaining clinical sites.**

  One of the most time-consuming activities for program directors is contract administration of clinical sites. Directors at public and private schools reported needing up to nine months to move a contract through the approval process. If being agile and reactive is a necessary attribute of being able to secure clinical sites, then the current contract process works against it. Having a streamlined clinical site contract process would be of major assistance to all allied health programs in the State.

- **Develop standardized clinical educational plans for all Allied Health programs, where none currently exist, and the requisite training for clinical preceptors.**

  For those careers where no standardized clinical experience exists, it is recommended that faculty and program coordinators from Connecticut schools take a leadership position in developing clinical training programs tailored to the specific discipline. These standardized clinical educational programs could then serve as a model for schools throughout the nation. Since many of these programs utilize field practitioners as preceptors, some of whom are non-degreed, it is imperative that programs include training for those who will be supervising the students' clinical experience.

Building Business-Allied Health Alliances

- **Create a State-lead Business-Academia partnership model.**

  Multiple examples of business-academic partnerships exist within Connecticut. These partnerships between the producers and consumers of allied health professionals can be crafted so that both parties benefit. Ultimately, the State benefits from both the perspective of employed citizens and from a robust allied health infrastructure. It is recommended that the existing pilot programs, such as the one in which hospital staff were mentored and trained as preceptors, be expanded to other schools. Lab facility sharing can also be handled in the same manner. While most partnerships have involved hospitals and colleges, it is further recommended that partnerships be explored between colleges and the not-so-obvious partners such as pharmaceutical companies.

Summary

This study looked at allied health and nursing programs across the State to determine whether program expansion was necessary, and whether there were problems with program sustainability in light of faculty staffing issues. Also examined were the program graduation data and the relationship of those numbers to the Department of Labor's estimated annual job openings, stated as demand or need.

While an increase in the numbers of newly trained allied health workers within Connecticut will assist in strengthening the State's manpower infrastructure, those increases need to be brought about through strategically targeted initiatives. Given that program expansion can not proceed without additional faculty and that the time to move from a Bachelor's degree to Master's degree is two years at a minimum and from Master's to Doctorate in five to six years, it is imperative that any faculty development initiatives be designed and implemented as soon as possible. The effects of initiatives that increase student retention and improve graduation rates will produce immediate, measurable results in producing higher numbers of allied health professionals.

Appendix 1 – Individuals Interviewed

Sorted by School/Business/Agency

	Contact	School/Business	Program(s)
1	Phyllis Hilt	Briarwood College	Medical Transcriptionist, Medical Coding, Health Info. Tech
2	Theresa DiVito	Capitol Community College	EMT
3	Cynthia Huge	CT Association of Pharmacists	Pharmacy Technicians
4	Stephen Carragher	CT Department of Public Health	Licensure Statistics
5	Alex Rodriguez	CT Department of Public Health	Emergency Med. Services
6	Pat Fennessy	CT Technical High Schools - Adult Ed programs	LPN, Dental Assisting, Dental Laboratory, Medical Assisting, Certified Nurse Aide, Surgical Technologist Health Technology
7	Patricia Santoro	Department of Higher Education	Graduate data
8	Dr. Jeanne Novotny	Fairfield University, School of Nursing	Nursing
9	Sheila Solernou	Gateway Community College	Nursing
10	Victoria Bozzuto	Gateway CC - Div. Director Allied Health	Radiology
11	Valerie Hylas	Gateway Community College	Diagnostic Med Sonography
12	Marcia Doran	Gateway Community College	Dietetics/Fitness Specialist
13	Kathleen Murphy	Gateway Community College	Nuclear Medicine
14	Gina Finn	Gateway Community College	Radiation Therapy
15	Julie Austin	Gateway Community College	Radiography
16	Zoe Durkin	Goodwin College	Histotechnician
17	Jan Costello	Goodwin College	Nursing
18	Frank Corvino	Greenwich Hospital-Pres./CEO	Business relationships
19	Phyllis Gutowski	Housatonic Community College	Clinical Laboratory Technician
20	Sherry Quigley	JM Wright Tech HS - Adult Ed	Certified Nurse Aide
21	Richard Clark	Manchester Community College	Surgical Technology
22	Margaret Guerrera	Naugatuck Valley Community College	Respiratory Therapy
23	Leona Bissonette	Norwalk Community College, Ext. Studies allied health programs	Phlebotomy, Certified Nurse Aide, Dental Assistant, Pharmacy Technician
24	Gail Howard	Norwalk Community College	HS-College allied health programs; retention
25	Lauren Perlstein	Norwalk Community College	Medical Assisting
26	Dr. Mary Schuler	Norwalk Community College	Nursing
27	Jim Goodwin	Norwalk Community College	Business Relationships
28	Karen Canty	Platt Tech HS - Adult Ed	Medical Assisting
29	Cynthia Lord	Quinnipiac University	Physician Assistant
30	Dr. Dori Taylor Sullivan	Sacred Heart University	Nursing

Individuals Interviewed, continued

	Contact	School/Business	Program(s)
31	Dr. Cesaria Thompson	Southern Connecticut State University	Nursing
32	Donna Barnick	St. Raphael's Hospital	Respiratory Therapy
33	Linda Perfetto	Three Rivers Community College	Nursing
34	Mary Bencivengo	Tunxis Community College	Dental Hygiene
35	Meg Zayan	University of Bridgeport	Dental Hygiene
36	Carol Polifronti	University of Connecticut	Nursing
37	Dr. Joe Smey	University of Connecticut, Storrs	Physical Therapy
38	Dr. Peter Kennedy	University of Hartford	Respiratory Therapy

Appendix 2 – Careers with Direct Patient Contact and Associated Programs in CT

Program of Study	Preferred Degree*	No. of Prog.	No. of '06 Grads	Job Need
Nursing – Cluster 1313	None	1	103	1081
(New RN grads in 2006 = 1053)	**AS**	8	510	
	BS	13	544	
	Grad/SYC	5	2	
	MS	20	328	
	Ph.D.	2	16	
Licensed Practical Nurse	None	13	181	294
Dental Hygiene	**AS**	4	79	100
	BS	3	30	
- Dental Assistant (incomplete '06 data)	None	8	35	172
(not transferable to Dental Hygiene)	AS /Cert	1 / 2	14 / 1	
Physical Therapy	**MS**	5	147[#]	111
	DPT	4	0	
- Pre-Physical Therapy	BS	3	27	
- Physical Therapist Assistant	AS	6	7	31
(not transferable to Phys. Therapy)				
Radiologic Technologist	None	1	63	107
	AS	4		
	BS	1	10	
Physician Asst./Pathologist Asst.	**MS**	2	78	31
Radiation Therapist	***Diploma***	***1***	***N/A***	***36***
	AS	1	5	
Occupational Therapist	***BS***	***2***	***4***	
	Grad	1	0	
	MOT[++]	2	38	51
- Occupational Therapist Asst.	AS	3	25	12
Audiologist / Communic. Disorders	**MA**	2	71	57
	Ph.D.	2	3	
Respiratory Care/Therapy	***AS***	***4***	***26***	***58***
	BS	2	13	
Cardiovascular Technologist	***AS***	***1***	***0***	***29***
Cardiovascular Perfusion	***GRAD***	***1***	***4***	
Surgical Technologist	Diploma	4	14*	17
	AS	1	18	
Diagnostic Medical Sonography	***Diploma***	***1***	***N/A***	***29***
	AS	1	9	
Dietitian	**BS**	2	24	20
	MS	1	5	
- Dietetic Technician	AS	2	15	10
Therapeutic Recreation	***BS***	***0***	***0***	***25***
- Therapeutic Recreation	AS / Cert	1 / 4	1 / 26	
Nuclear Medicine Technologist	***AS / Cert***	***2 / 2***	***8 / 0***	***12***

Note: Preferred entry level degree is bolded

* **=** Incomplete data for 2006

Bold Italic text = Supply less than annual demand

[++] = In 2007, entry level advanced from a BS to MOT

[#] = Three MS program have closed or been replaced by DPT programs; graduation rates may lag for a number of years until doctoral students begin to graduate.

ITAL = Italicized program names represent lower-level career ladder programs

NOTE: Because of incomplete graduation data, the following direct patient care careers were not included in the table: Patient Care Assistant, Medical/Clinical Assistant, and EMT/Paramedic.

Appendix 3- Allied Health Programs in Connecticut

Program Name	Degree Conferred	No. of Programs	Preferred Entry Level Education
Adult Health Nursing			
	GRAD	2	Associate Degree
	MSN	1	Associate Degree
Allied Health			
	C2	1	Master's Degree
	MS	1	Master's Degree
Allied Health - Rehab Sci/Geriatric Rehab & Wellness			
	BS	1	Bachelor's Degree
	MS	1	Bachelor's Degree
Art Therapist			
	GRAD	1	Bachelor's Degree
	MA	1	Bachelor's Degree
Audiologist/Speech-Language Pathologist			
	MA	1	Master's Degree
	MS	1	Master's Degree
	Ph.D.	1	Master's Degree
Audiology			
	Ph.D.	1	Master's Degree
Biological Sciences: Anesthesia			
	MS	1	Master's Degree
Cardiovascular Technologist			
	AS	1	Associate Degree
	GRAD	1	Associate Degree
Clinical Lab Science/Medical Technologist			
	BS	5	Bachelor's Degree
	GRAD	1	Bachelor's Degree
	MHS	1	Bachelor's Degree
Clinical/Medical Laboratory Technician			
	AS	2	Associate Degree
Community/Public Health Nursing			
	MSN	1	Master's Degree
Cytotechnology			
	BS	1	Bachelor's Degree
Dental Assistant			
	AAS	1	Moderate-term OJT Training
	C3	2	Moderate-term OJT Training
	None	9	Moderate-term OJT Training
Dental Hygienists			
	AS	4	Associate Degree
	BS	3	Associate Degree
Dental Laboratory Technician			
	None	1	Long-term OJT Training
Diagnostic Genetic Sciences			
	BS	1	Bachelor's Degree
Diagnostic Med Sonography/ Ultrasound Technician			
	None	1	Associate Degree
	AS	1	Associate Degree
	C2	1	Associate Degree
Dietetic Technician			
	AAS	1	Moderate-term OJT Training
	AS	1	Moderate-term OJT Training
	C2	1	Moderate-term OJT Training

Program Name	Degree Conferred	No. of Programs	Preferred Entry Level Education
Dietitian -combined with Human Nutrition & Gen'l Wellness			
	BS	2	Bachelor's Degree
	MS	1	Bachelor's Degree
Electrocardiograph Technician			
	None	2	Post-secondary Vocational
Emergency Medical Technician and Paramedics			
	AS	2	Post-secondary Vocational
	C2	4	Post-secondary Vocational
	C3	1	Post-secondary Vocational
	Option	1	Post-secondary Vocational
Family Nurse Practitioner			
	GRAD	1	Grad Cert or Work Exp.Plus
	MSN	2	Grad Cert or Work Exp.Plus
	SYC	1	Grad Cert or Work Exp.Plus
Health Care Administration / Management			
	BS	1	Grad Cert or Work Exp.Plus
	GRAD	1	Grad Cert or Work Exp.Plus
	MS	4	Grad Cert or Work Exp.Plus
Health Info/Med Records Technician			
	AAS	1	Associate Degree
	AS	1	Associate Degree
	C3	2	Associate Degree
Health Professions and Related Clinical Sciences			
	AS	2	Post-secondary Vocational
	BS	2	Post-secondary Vocational
	C2	1	Post-secondary Vocational
Healthcare Support Workers			
	BS	3	Post-secondary Vocational
	C2	1	Post-secondary Vocational
Hematology			
	GRAD	1	Bachelor's Degree
Histotechnician			
	C3	1	Post-secondary Vocational
Licensed Practical Nurse/Vocational Nurse			
	None	13	Post-secondary Vocational
Long Term Health Care			
	GRAD	1	Post-secondary Vocational
Massage Therapist			
	None	3	Post-secondary Vocational
Medical Administrative/Exec.Asst.			
	AAS	1	Post-secondary Vocational
	C3	1	Post-secondary Vocational
	None	5	Post-secondary Vocational
Medical Insurance Coding Specialist			
	C2	1	Post-secondary Vocational
	Option	2	Post-secondary Vocational
Medical Insurance Specialist (plus others)			
	None	4	Post-secondary Vocational
Medical Office / Long Term Health Care Admin.			
	C3	2	Post-secondary Vocational
	GRAD	1	Post-secondary Vocational
	None	1	Post-secondary Vocational
Medical Office Mgt/Allied Health Admin.			
	AAS	1	Work Experience in Related Occupation
	AS	2	Work Experience in Related Occupation

Program Name	Degree Conferred	No. of Programs	Preferred Entry Level Education
Medical Transcriptionist			
	C3	1	Post-secondary Vocational
	None	1	Post-secondary Vocational
Medical/Clinical Assistant			
	AAS	1	Moderate-term OJT Training
	AS	5	Moderate-term OJT Training
	C2	5	Moderate-term OJT Training
	C3	2	Moderate-term OJT Training
	None	10	Moderate-term OJT Training
Nuclear Medicine Technologist			
	AS	1	Associate Degree
	C2	1	Associate Degree
	C3	1	Associate Degree
Nursing/RN to BSN Completion Program			
	BSN	1	Bachelor's Degree
	SYC	1	Bachelor's Degree
Nursing Administration (MSN/MS/Ph.D.)			
	MS	2	Master's Degree
	MSN	5	Master's Degree
Nursing Assistant/Aide and Patient Care Ass't			
	C2	2	Short-term OJT Training
	None	12	Short-term OJT Training
Nursing Science, MS/PhD.			
	DNS	1	Doctoral Degree
	MS	3	Doctoral Degree
	MSN	1	Doctoral Degree
	Ph.D.	1	Doctoral Degree
Occupational Therapist			
	BS	2	Bachelor's Degree
	GRAD	1	Bachelor's Degree
	MOT	1	Bachelor's Degree
	MS	1	Bachelor's Degree
Occupational Therapist Assistants			
	AAS	1	Associate Degree
	AS	2	Associate Degree
Pathology/Pathologist Assistant			
	MHS	1	Bachelor's Degree
Pharmacy Technician			
	C3	1	Moderate-term OJT Training
	None	4	Moderate-term OJT Training
Phlebotomy			
	C2	1	Post-secondary Vocational
	None	5	Post-secondary Vocational
Physical Therapist Assistant			
	AS	6	Associate Degree
Physical Therapy/Therapist			
	BS	1	Master's Degree
	DPT	4	Master's Degree
	MS	1	Master's Degree
	MSPT	3	Master's Degree
Physician Assistant			
	MHS	1	Bachelor's Degree
	MMS	1	Bachelor's Degree
Pre-Pharmacy Studies			
	BS	1	Bachelor's Degree

Program Name	Degree Conferred	No. of Programs	Preferred Entry Level Education
Public Health, General			
	BS	1	Master's Degree
	MPH	3	Master's Degree
	MS	1	Master's Degree
Radiation Therapist			
	None	1	Associate Degree
	AS	1	Associate Degree
	BS	1	Associate Degree
Radiographic Technology/Radiographer			
	None	5	Associate Degree
	AS	5	Associate Degree
	BS	1	Associate Degree
Registered Nurse			
	AS	8	Associate Degree
	BS	7	Associate Degree
	BSN	4	Associate Degree
	MS	2	Associate Degree
	MSN	2	Associate Degree
	None	1	Associate Degree
Respiratory Care Therapist			
	AS	4	Associate Degree
	BS	2	Associate Degree
Surgical Technologist			
	AS	1	Post-secondary Vocational
	None	4	Post-secondary Vocational
Therapeutic Recreation			
	AS	1	Associate Degree
	C2	3	Associate Degree

Appendix 4 - CT Allied Health Programs by School

Institution-Name / School Program Name	Degree Conferred	CIP Grouping
A.I. Prince Regional Voc. Tech. School		
Dental Assisting	None	Dental Assistant
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Surgical Technologist	None	Surgical Technologist
Albertus Magnus College		
Art Therapy	GRAD	Art Therapist
Art Therapy	MA	Art Therapist
American Red Cross Vocational School		
EKG Training Program	None	Electrocardiograph Technician
Nurse Assistant Training	None	Nursing Assistant/Aide and Patient
Phlebotomy	None	Phlebotomy
Branford Hall Career Institute		
Health Claims Specialist	None	Medical Insurance Specialist (plus
Massage Therapy	None	Massage Therapist
Medical Assistant	None	Medical/Clinical Assistant
Briarwood College		
Administrative Medical Professional	C3	Medical Administrative/Exec.Asst.
Administrative Technology: Medical	AAS	Medical Administrative/Exec.Asst.
Dental Administrative Assistant	AAS	Dental Assistant
Dental Chairside Assistant	C3	Dental Assistant
Dental Hygiene	AS	Dental Hygienists
Dietetic Technician	AAS	Dietetic Technician
Executive Medical Assistant	AAS	Medical/Clinical Assistant
Health Information Coding / Processing	C3	Health Info/Med Records Technician
Health Information Technology	AAS	Health Info/Med Records Technician
Medical Assistant	C3	Medical/Clinical Assistant
Medical Office Management	AAS	Medical Office Mgt/Allied Health
Medical Transcription	C3	Medical Transcriptionist
Nuclear Medicine Technology	C2	Nuclear Medicine Technologist
Occupational Therapy Assistant	AAS	Occupational Therapist Assistants
Pharmacy Technician	C3	Pharmacy Technician
Bridgeport Hospital		
Nursing	None	Registered Nurse
Surgical Technology	None	Surgical Technologist
Bullard-Havens Regional Voc. Tech. School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Butler Business School		
Medical Assistant/Secretary	None	Medical/Clinical Assistant
Medical Office Assistant	None	Medical Administrative/Exec.Asst.
Capital Community College		
Business Office Technology Careers: Health	Option	Medical Insurance Coding Specialist
Emergency Med Tech: Emergency Mgmnt	C2	Emergency Med. Tech and Paramedics
Emergency Medical Services Instructor	C2	Emergency Med. Tech and Paramedics
Emergency Medical Technician - Paramedic	C2	Emergency Med. Tech and Paramedics
Emergency Medical Technician - Paramedic	Option	Emergency Medical Technician and
Medical Assisting - Insurance Specialist	Option	Medical Insurance Coding Specialist
Medical Assisting	AS	Medical/Clinical Assistant
Medical Assisting	C2	Medical/Clinical Assistant
Medical Assisting	C3	Medical Office / Long Term Health
Nursing	AS	Registered Nurse
Paramedic Studies	AS	Emergency Medical Technician and
Paramedic Studies: Emergency Mgmnt Response	AS	Emergency Medical Technician and
Physical Therapist Assistant	AS	Physical Therapist Assistant
Radiologic Technology	AS	Radiographic

Institution-Name / School Program Name	Degree Conferred	CIP Grouping
Central Connecticut State University		
Nursing	BSN	Registered Nurse
Charter Oak State College		
Healthcare Studies	C2	Health Professions and Related
Connecticut Center for Massage Therapy, Inc.		
Massage Therapy	None	Massage Therapist
Connecticut Training Centers		
Administrative Medical Assistant	None	Medical Office / Long Term Health
Billing and Coding Specialist	None	Medical Insurance Specialist (plus
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Clinical Medical Assistant	None	Medical/Clinical Assistant
EKG Technician	None	Electrocardiograph Technician
Medical Transcription	None	Medical Transcriptionist
Phlebotomy Technician	None	Phlebotomy
Cook's Nurse Aide Training Program		
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Danae's Training Center		
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Dental Careers Institute		
Dental Assisting	None	Dental Assistant
Dent-Temp Careers, LLC		
Dental Assistant	None	Dental Assistant
E.C. Goodwin Regional Voc. Tech. School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Educational Training of Wethersfield		
Medical Billing & Coding	None	Medical Insurance Specialist (plus
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Eli Whitney Regional Voc. Tech. School		
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Dental Assisting	None	Dental Assistant
Dental Laboratory	None	Dental Laboratory Technician
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Surgical Technologist	None	Surgical Technologist
Fairfield University		
Advanced Practice Nursing	MSN	Registered Nurse
Biological Sciences: Anesthesia	MS	Biological Sciences: Anesthesia
Nursing	BS	Registered Nurse
Fox Institute of Business		
Massage Therapy	None	Massage Therapist
Medical Assistant	None	Medical/Clinical Assistant
Medical Coding & Billing Specialist	None	Medical Insurance Specialist (plus
Gateway Community College		
Diagnostic Medical Sonography	AS	Diagnostic Med Sonography
Diagnostic Medical Sonography	C2	Diagnostic Med Sonography
Health Information Management	AS	Health Info/Med Records Technician
Nuclear Medicine Technologist	AS	Nuclear Medicine Technologist
Nuclear Medicine Technology	C3	Nuclear Medicine Technologist
Nursing	AS	Registered Nurse
Nutrition & Fitness: Dietetic Technology	AS	Dietetic Technician
Nutrition & Fitness: Fitness Specialist Studies	C2	Dietetic Technician
Pre-Allied Health	C2	Allied Health
Radiation Therapy	AS	Radiation Therapist
Radiography	AS	Radiologic Technicians

Institution-Name / School Program Name	Degree Conferred	CIP Grouping
Goodwin College		
EMT-Paramedic	C2	Emergency Medical Technician and
Health Sciences	AS	Health Professions and Related
Healthcare Support	C2	Healthcare Support Workers
Histotechnician	C3	Histotechnician
Medical Assisting	AS	Medical/Clinical Assistant
Medical Assisting	C3	Medical/Clinical Assistant
Medical Billing and Coding	C2	Medical Insurance Coding Specialist
Medical Office	C3	Medical Office / Long Term Health
Nursing	AS	Registered Nurse
Patient Care Associate	C2	Nursing Assistant/Aide and Patient
Respiratory Care	AS	Respiratory Care Therapist
Hartford Hospital School of Allied Health		
Phlebotomist	None	Phlebotomy
Radiation Therapy	None	Radiation Therapist
Radiographer	None	Radiologic Technicians
Henry Abbott Regional Voc. Tech. School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Housatonic Community College		
Clinical Laboratory Technology	AS	Clinical/Medical Laboratory
Nursing	AS	Registered Nurse
Occupational Therapy Assistant	AS	Occupational Therapist Assistants
Physical Therapist Assistant	AS	Physical Therapist Assistant
Howell Cheney Satellite School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
J.M. Wright Regional Voc. Tech. School		
Certified Nurse Assistant	None	Nursing Assistant/Aide and Patient
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Manchester Community College		
Medical Laboratory Technician	AS	Clinical/Medical Laboratory
Occupational Therapy Assistant	AS	Occupational Therapist Assistants
Physical Therapist Assistant	AS	Physical Therapist Assistant
Respiratory Care	AS	Respiratory Care Therapist
Surgical Technology	AS	Surgical Technologist
Therapeutic Recreation	AS	Therapeutic Recreation
Therapeutic Recreation	C2	Therapeutic Recreation
Med-Care Training		
Introduction to Dental Assisting	None	Dental Assistant
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Middlesex Community College		
Pharmacy Technician	None	Pharmacy Technician
Radiologic Technology	AS	Radiographic
Therapeutic Recreation	C2	Therapeutic Recreation
Naugatuck Valley Community College		
Nursing	AS	Registered Nurse
Physical Therapist Assistant	AS	Physical Therapist Assistant
Radiologic Technology	AS	Radiographic
Respiratory Care	AS	Respiratory Care Therapist
New England Technical Institute		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Medical Assisting	None	Medical/Clinical Assistant
New Haven Professional School		
Nurse's Assistant Training Program	None	Nursing Assistant/Aide and Patient
Northwest Connecticut Community College		
Allied Heath Science	C2	Medical/Clinical Assistant
Allied Health Administration	AS	Medical Office Mgt/Allied Health
Hospital Patient Care Technician	C2	Medical/Clinical Assistant
Medical Assisting	AS	Medical/Clinical Assistant
Physical Therapist Assistant	AS	Physical Therapist Assistant
Renal Dialysis Patient Care Technician	C2	Medical/Clinical Assistant

Institution-Name / School Program Name	Degree Conferred	CIP Grouping
Northwest Connecticut Community College, continued		
Therapeutic Recreation	C2	Therapeutic Recreation
Norwalk Community College		
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Dental Assistant	None	Dental Assistant
Medical Assistant	C2	Medical/Clinical Assistant
Medical Office Management	AS	Medical Office Mgt/Allied Health
Nursing	AS	Registered Nurse
Paramedic Studies	C3	Emergency Medical Technician and
Pharmacy Technician	None	Pharmacy Technician
Phlebotomy	None	Phlebotomy
Respiratory Care	AS	Respiratory Care Therapist
Norwich Regional Voc. Tech. School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Platt Technical High School		
Medical Assisting	None	Medical/Clinical Assistant
Porter & Chester Institute		
Medical Assisting	None	Medical/Clinical Assistant
Quinnebaug Valley Community College		
Health Info Mgmnt Tech: Coding Specialist	C3	Health Info/Med Records Technician
Medical Assisting	AS	Medical/Clinical Assistant
Patient Care Technician	C2	Nursing Assistant/Aide and Patient
Phlebotomy	C2	Phlebotomy
Quinnipiac University		
Adult Nurse Practitioner	GRAD	Adult Health Nursing
Biomedical Science	BS	Clinical Lab Science/Medical
Cardiovascular Perfusion	GRAD	Cardiovascular Technologist
Clinical Laboratory Science	BS	Clinical Lab Science/Medical
Clinical Laboratory Science	GRAD	Clinical Lab Science/Medical
Diagnostic Imaging	BS	Radiation Therapist
Health & Science Studies	BS	Health Professions and Related
Health Administration	MS	Health Care Administration /
Hematology	GRAD	Hematology
Long Term Health Care Administration	GRAD	Medical Office / Long Term Health
Medical Laboratory Sciences	MHS	Clinical Lab Science/Medical
Nursing	BSN	Registered Nurse
Nursing	MSN	Nursing Science, MS/PhD.
Nursing - Forensic Nurse Clinical Specialist	MS	Registered Nurse
Nursing: Adult Nurse Practitioner	MS	Nursing Science, MS/PhD.
Nursing: Family Nurse Practitioner	MS	Nursing Science, MS/PhD.
Nursing: Forensic Nursing Clinical Specialist	MS	Nursing Science, MS/PhD.
Occupational Therapy	BS	Occupational Therapist
Occupational Therapy	GRAD	Occupational Therapist
Occupational Therapy	MOT	Occupational Therapist
Pathologists' Assistant	MHS	Pathology/Pathologist Assistant
Physical Therapy	DPT	Physical Therapy/Therapist
Physical Therapy	MS	Physical Therapy/Therapist
Physician Assistant	MHS	Physician Assistant
Respiratory Care	BS	Respiratory Care Therapist
Ridley-Lowell		
Medical Assistant	None	Medical/Clinical Assistant
Sacred Heart University		
Family Nurse Practitioner	MSN	Family Nurse Practitioner
Family Nurse Practitioner	SYC	Family Nurse Practitioner
Geriatric Rehabilitation & Wellness	MS	Allied Health - Rehab Sci. / Geriatric
Health Systems Management	MS	Health Care Administration /
Nursing - Post RN	BS	Registered Nurse
Nursing (Full and Bridge from RN)	BS	Registered Nurse
Occupational Therapy	MS	Occupational Therapist
Patient Care Services Administration	MSN	Nursing Administration
Patient Care Services Administration-online	MSN	Nursing Administration
Physical Therapy	DPT	Physical Therapy/Therapist

Institution-Name / School Program Name	Degree Conferred	CIP Grouping
Sacred Heart University, continued		
Physical Therapy	MSPT	Physical Therapy/Therapist
RN to BSN Completion Program, off-site	BSN	Nursing / RN to BSN Completion
Southern Connecticut State University		
Communications Disorders	MS	Audiologist/Speech-Language
Family Nurse Practitioner	MSN	Family Nurse Practitioner
Nurse Practitioner	GRAD	Family Nurse Practitioner
Nursing	BS	Registered Nurse
Nursing	MSN	Registered Nurse
Public Health	BS	Public Health, General
Public Health	MPH	Public Health, General
St. Joseph College		
Nursing	BS	Registered Nurse
Nursing	MS	Registered Nurse
St. Vincent's College		
Cardiovascular Technology	AS	Cardiovascular Technologist
Medical Assisting	AS	Medical/Clinical Assistant
Nursing	AS	Registered Nurse
Pharmacy Technician	None	Pharmacy Technician
Radiography	AS	Radiographic
Stone Academy		
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Medical Assisting	None	Medical/Clinical Assistant
Medical Office Administration	None	Medical Administrative/Exec.Asst.
Medical Office Administration - Waterbury	None	Medical Administrative/Exec.Asst.
Medical Office Professional	None	Medical Administrative/Exec.Asst.
Medical Office Professional - Waterbury	None	Medical Administrative/Exec.Asst.
Teamwork, LLC		
Dental Assisting	None	Dental Assistant
Medical Assisting	None	Medical/Clinical Assistant
Phlebotomy	None	Phlebotomy
Three Rivers Community College		
Nursing	AS	Registered Nurse
Tunxis Community College		
Dental Assisting	C3	Dental Assistant
Dental Hygiene	AS	Dental Hygienists
Physical Therapist Assistant	AS	Physical Therapist Assistant
University of Bridgeport		
Dental Hygiene	AS	Dental Hygienists
Dental Hygiene	BS	Dental Hygienists
University of Connecticut		
Allied Health	MS	Allied Health
Allied Health - AS-BS Articulation	BS	Healthcare Support Workers
Allied Health - Diagnostic Sciences	BS	Healthcare Support Workers
Allied Health - Health Promotion Science	BS	Healthcare Support Workers
Allied Health - Rehabilitation Sciences	BS	Allied Health - Rehab Sci / Geriatric
Audiology	Ph.D.	Audiology
Communication Science & Audiology	MA	Audiologist/Speech-Language
Communication Science & Audiology	Ph.D.	Audiologist/Speech-Language
Cytotechnology	BS	Cytotechnology
Diagnostic Genetic Sciences	BS	Diagnostic Genetic Sciences
Dietetics	BS	Dietitian -combined with Human
Physical Therapy	DPT	Physical Therapy/Therapist
Health Care Management	BS	Health Care Administration /
Medical Technology	BS	Clinical Lab Science/Medical
Nursing	BSN	Registered Nurse
Nursing	MS	Nursing Administration
Nursing	Ph.D.	Nursing Science, MS/PhD.
Nursing Post Baccalaureate	GRAD	Adult Health Nursing
Pharmacy Studies	BS	Pre-Pharmacy Studies

Institution-Name School Program Name	Degree Conferred	CIP Grouping
University of Connecticut, continued		
Pharmacy Technician	None	Pharmacy Technician
Physical Therapy	MSPT	Physical Therapy/Therapist
Pre-Physical Therapy	BS	Physical Therapy/Therapist
Public Health	MPH	Public Health, General
University of Connecticut Health Center		
Public Health	MPH	Public Health, General
University of Hartford		
Clinical Laboratory Science/Medical	BS	Clinical Lab Science/Medical
Community/Public Health Nursing	MSN	Community/Public Health Nursing
Health Science	AS	Health Professions and Related
Health Science	BS	Health Professions and Related
Nursing	BSN	Registered Nurse
Nursing & Organizational Behavior	MS	Nursing Administration
Nursing (Administration/Education)	MSN	Nursing Administration
Occupational Therapy	BS	Occupational Therapist
Physical Therapy	DPT	Physical Therapy/Therapist
Physical Therapy	MSPT	Physical Therapy/Therapist
Radiologic Technology	BS	Radiographic
Respiratory Care	BS	Respiratory Care Therapist
University of New Haven		
Dental Hygiene	AS	Dental Hygienists
Dental Hygiene (online and on-ground)	BS	Dental Hygienists
Health Care Administration	MS	Health Care Administration /
Health Care Management	GRAD	Health Care Administration /
Human Nutrition	MS	Dietitian -combined with Human
Long Term Health Care	GRAD	Long Term Health Care
Nutrition & Dietetics	BS	Dietitian -combined with Human
Valley Medical Institute		
Dental Assistant	None	Dental Assistant
Certified Nurse Aide	None	Nursing Assistant/Aide and Patient
Vinal Regional Voc. Tech. School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
W.F. Kaynor Regional Voc. Tech. School		
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Western Connecticut State University		
Health Care Administration	MS	Health Care Administration /
Medical Technology	BS	Clinical Lab Science/Medical
Nursing	BS	Registered Nurse
Nursing	MSN	Adult Health Nursing
Nursing - Waterbury	BS	Registered Nurse
Windham Regional Voc. Tech. School		
Dental Assisting	None	Dental Assistant
Licensed Practical Nurse	None	Licensed Practical Nurse/Vocational
Yale-New Haven Hospital		
Diagnostic Ultrasound	None	Diagnostic Med Sonography
Surgical Technology	None	Surgical Technologist
Yale University		
Epidemiology & Public Health	MS	Public Health, General
Nursing	DNS	Nursing Science, MS/PhD.
Nursing	MSN	Nursing Administration
Nursing	SYC	Nursing / RN to BSN Completion
Nursing-8	MSN	Nursing Administration
Physician Associate	MMS	Physician Assistant

Appendix 5 - Non-Degree Entry Level Allied Health Careers

Program Title	Annual Demand	Current Grads	Short/ - Over	Educational Entry Level
Nursing Assistant/Aide and Patient Care Ass't	921	2031	1110	Short-term OJT
Dental Assistant	172	187	15	Moderate-term OJT
Dietetic Technician	10	15	5	Moderate-term OJT
Medical/Clinical Assistant	253	621	368	Moderate-term OJT
Pharmacy Technician**	81	1**	**-80**	Moderate-term OJT
Dental Laboratory Technician	17	11	**-6**	Long-term OJT
Electrocardiograph Technician	unspecified	no data	0	Post-secondary Voc
Emergency Medical Technician and Paramedics	63	253	190	Post-secondary Voc
Health Professions and Related Clinical Sciences	unspecified	190	190	Post-secondary Voc
Healthcare Support Workers	68	22	**-46**	Post-secondary Voc
Histotechnician	unspecified	0	0	Post-secondary Voc
Licensed Practical Nurse/Voc. Nurse Training	294	181	**-113**	Post-secondary Voc
Long Term Health Care ++	56	0	**-68**	Post-secondary Voc
Massage Therapist	23	585	562	Post-secondary Voc
Medical Administrative/Exec.Asst.	180	45	**-135**	Post-secondary Voc
Medical Insurance Coding Specialist ++	56	31	**-37**	Post-secondary Voc
Medical Insurance Specialist (plus others) ++	56	225	157	Post-secondary Voc
Medical Office /Long Term Health Care Admin. ++	56	1	**-67**	Post-secondary Voc
Medical Transcriptionist	43	0	**-43**	Post-secondary Voc
Phlebotomy	unspecified	**	0	Post-secondary Voc
Surgical Technologist	17	31	14	Post-secondary Voc
Medical Office Mgt/Allied Health Admin.	180	45**	-135	Work Experience in Related Occupation

** = incomplete data

++ = These four career area have no direct match to any annual need figure.

Appendix 6 – Associate Degree Entry Level Allied Health Careers

Program Title	Annual Demand	Current Grads	Short/ - Over	Educational Entry Level
Cardiovascular Technologist	29	4	-25	Associate Degree
Clinical/Medical Laboratory Technician	59	4	-55	Associate Degree
Dental Hygienists	100	109	9	Associate Degree
Diagnostic Med Sonography/ Ultrasound Tech.	29	9	-20	Associate Degree
Health Info/Med Records Technician	50	4	-46	Associate Degree
Nuclear Medicine Technologist	12	8	-4	Associate Degree
Occupational Therapist Assistants	12	25	13	Associate Degree
Physical Therapist Assistant	30	7	-23	Associate Degree
Radiation Therapist	36	5	-31	Associate Degree
Radiographic Technology/Radiographer	107	117	10	Associate Degree
Registered Nurse	1081	1076**	-5	Associate Degree
Respiratory Care Therapist	58	39	-19	Associate Degree
Therapeutic Recreation	25	27	2	Associate Degree

**** =** This is the number of graduates, reported to DHE. RNs from diploma programs, who went on to acquire an Associate degree are included. For this reason, the number of 1076 *is not equivalent* to the number of annual "new" registered nurses.

Descending by Shortage:

Program Title	Annual Demand	Current Grads	Short/ - Over	Educational Entry Level
Clinical/Medical Laboratory Technician	59	4	**-55**	Associate Degree
Health Info/Med Records Technician	50	4	**-46**	Associate Degree
Radiation Therapist	36	5	**-31**	Associate Degree
Cardiovascular Technologist	29	4	**-25**	Associate Degree
Physical Therapist Assistant	30	7	**-23**	Associate Degree
Diagnostic Med Sonography/ Ultrasound Tech.	29	9	**-20**	Associate Degree
Respiratory Care Therapist	58	39	**-19**	Associate Degree
Registered Nurse	1081	1076	**-5**	Associate Degree
Nuclear Medicine Technologist	12	8	**-4**	Associate Degree
Therapeutic Recreation	25	27	2	Associate Degree
Dental Hygienists	100	109	9	Associate Degree
Radiographic Technology/Radiographer	107	117	10	Associate Degree
Occupational Therapist Assistants	12	25	13	Associate Degree

Appendix 7- Bachelor Degree Entry Level Allied Health Careers

Program Title	Annual Demand	Current Grads	Short/ - Over	Educational Entry Level
Allied Health-Rehab Sci /Geriatric Rehab & Well	unspecified	0	N/A	Bachelor's Degree
Art Therapist	0	7	7	Bachelor's Degree
Clinical Lab Science/Medical Technologist	90	54	-36	Bachelor's Degree
Cytotechnology	1	5	4	Bachelor's Degree
Diagnostic Genetic Sciences	0	21	21	Bachelor's Degree
Dietitian - with Human Nutrit & Gen'l Well	20	29	9	Bachelor's Degree
Occupational Therapist	51	42	-9	Bachelor's Degree
Pathologist Ass't (16)/Physician Ass't (78)	31	94	63	Bachelor's Degree
Pre-Pharmacy Studies	unspecified	105	N/A	Bachelor's Degree

NOTE 1: DOL Demand-data combines medical and clinical lab technicians
NOTE 2: While DOL data associates Physician Assistants with a Bachelor's degree entry level, the only programs in the State are at the Master's degree level at Yale and Quinnipiac.

Descending by Shortage:

Program Title	Annual Demand	Current Grads	Short/ - Over	Educational Entry Level
Clinical Lab Science/Medical Technologist	90	54	**-36**	Bachelor's Degree
Occupational Therapist	51	42	**-9**	Bachelor's Degree
Cytotechnology	1	5	4	Bachelor's Degree
Art Therapist	0	7	7	Bachelor's Degree
Dietitian - with Human Nutrit & Gen'l Well	20	29	9	Bachelor's Degree
Diagnostic Genetic Sciences	0	21	21	Bachelor's Degree
Pathologist Assistant / Physician Assistant	31	94	63	Bachelor's Degree
Allied Health-Rehab Sci /Geriatric Rehab & Well	unspecified	0	N/A	Bachelor's Degree
Pre-Pharmacy Studies	unspecified	105	N/A	Bachelor's Degree

Appendix 8 - Master's and Doctoral Degree Entry Level Allied Health Careers

Program Title	Annual Demand	Current Grads	Short/ - Over	Educational Entry Level
Allied Health	1	10	9	Master's Degree
Audiologist/Speech-Language Pathologist	57	74	17	Master's Degree
Biological Sciences: Anesthesia	unspecified	28	28	Master's Degree
Community/Public Health Nursing	unspecified	0	N/A	Master's Degree
Nursing Administration (MSN/MS/Ph.D.)	unspecified	230	230	Master's Degree
Physical Therapy/Therapist	111	147	36	Master's Degree
Public Health, General	unspecified	198	198	Master's Degree
Nursing Science, MS/PhD.	13	46	33	Doctoral Degree

Appendix 9 –Critical Care Allied Health Careers

The following subset of allied health careers, listed in previous appendices, identifies those programs which train students for careers where they will be interfacing with patients in distressed situations, or said differently, patients for which critical care is essential.

Program Title	Educational Entry Level	Need	Short / - Over
Adult Health Nursing	**Master's Degree**	unspecified	N/A
Cardiovascular Technologist	**Associate Degree**	29	-29
Diagnostic Med Sonography/ Ultrasound Tech.	**Associate Degree**	29	-20
Emergency Medical Technician / Paramedic	Post-secondary Voc.	63	190
Licensed Practical Nurse	Post-secondary Voc.	294	-113
Medical/Clinical Assistant	Moderate-term OJT	253	368
Nuclear Medicine Technologist	**Associate Degree**	12	-4
Nurse Anesthetist	**Master's Degree**	unspecified	N/A
Nursing Administration (MSN/MS/Ph.D.)	**Master's Degree**	unspecified	N/A
Patient Care Ass't / Nursing Assistant/Aide	Short-term OJT	921	1110
Pharmacy Technician	Moderate-term OJT	80	unknown
Physician Assistant	**Bachelor's Degree**	31	47
Radiation Therapist	**Associate Degree**	36	-31
Radiographic Technology/Radiographer	**Associate Degree**	107	-34
Registered Nurse	**Associate Degree**	1081	-28
Respiratory Care Therapist	**Associate Degree**	58	-19
Surgical Technologist	Post-secondary Voc.	17	14

Appendix 10 – Nursing School Retention Figures

School	Students Admitted 2002	Graduates in 2004	Students Admitted 2003	Graduates in 2005
Diploma and AS degree programs:				
Bridgeport Hospital	137	104	117	92
Capital Community College	123	64	133	72
Gateway Community College	27	24	33	27
Goodwin College	0	0	38	38
Naugatuck Community College	85	55	109	84
Norwalk Community College	53	28	90	37
Three Rivers Community College	67	35	78	56
St. Vincent's College	95	64	85	69
Totals:	**587**	**374**	**683**	**475**
Student loss		213		208
Graduating % / Attrition %:	63.71% / 36.29%		69.55 / 30.45	
BS degree programs				
Fairfield University	50	44	64	83
Quinnipiac University	53	47	67	54
Sacred Heart University	48	24	53	18
St. Joseph's College	77	38	56	55
Southern CT State University	90	56	85	74
University of Connecticut	62	89	103	101
Western CT State University	38	16	71	27
Totals:	**418**	**314**	**526**	**412**
Student loss		104		114
Graduating % / Attrition %:	75.1% / 24.9%		78.3% / 21.7%	
Grand Totals (diploma/AS/BS):	1005	688	1209	887
Total student loss:		317		322
Avg student loss – entire population		31.5%		26.6%

NOTE 1: Multiple factors can distort graduation figures. The underlying assumption is that once admitted to nursing school, the student completes the program in two years. If there is a delay in graduation, then the student may have finished the nursing program, but not yet completed all required courses to obtain the degree.

NOTE 2: This table does not include graduation figures from RN-to-BSN completion programs.

Appendix 11 – Retired Nurses' Survey

Cover Letter

Allied Health Study

Subject: **Utilization of retired nursing professionals**
Date: April 13, 2007

Thank you for taking the time to fill out this brief survey. As a nursing professional, you have a clear insight on the state of the profession and an understanding of the coming worker shortage in allied heath.

One of the suggestions to alleviate some of the strain on our nursing schools with their inability to find qualified full-time faculty has been to utilize retired nurses in mentoring, tutoring, and lab positions within the various schools of nursing throughout the state of Connecticut. Research has clearly shown that having tutors and mentors available to students increases retention rates and, subsequently, the graduation numbers. Without this type of support, drop-out and failure rates in nursing programs range between 30 to 50 percent of the entering cohort, nationally. Cutting the drop-out/failure rate in half would effectively see nearly 300 more nurses graduate annually from Connecticut nursing programs.

Because it will take up to seven years to build the number of nursing educators needed to qualify for full time faculty positions within the nursing programs (i.e., holding Masters and Doctorate degrees), increasing the student retention/graduation rate is the only action that will increase the number of new nursing graduates in the near-term.

Thanks, again, for participating in this survey. Your input will be utilized in the study's final report which will be given to the State Legislature on January 1st, 2007. Completed questionnaires can be returned via email to bbelon@belon-rp.com or can be mailed to the above address.

Regards,

Barbara J. Huffman de Belon

Barbara J. Huffman de Belon, Ed.D.

Survey Questions:

1. Retirement date from full-time employment: _____

2. Highest educational degree held: (Check ✓ one)

____ Diploma ____ Associate ____ Bachelor

____ 6th yr certificate ____ Master ____ Doctorate

3. In your last position, identify in what type of facility you were working: (Check ✓ one)

____ Acute care facility ____ Doctor's office ____ Pharmaceutical company

____ Insurance company ____ Community nursing

____ Other (please explain) _____

4. Willingness to consider working part-time as a tutor, mentor, or lab assistant at a local nursing school (Check ✓ one)

____ Very willing ____ Somewhat willing ____ No interest at all

5. Your suggestions for increasing the number of nursing graduates within the state:

Thank you for your participation. Completed questionnaires can be returned via email to bbelon@belon-rp.com or can be mailed to:
Dr. Barbara Belon, 3 Bonnybrook Road, Norwalk, CT 06850

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