Final Report #136

The Contributions of Community Colleges to the Education of Allied Health Professionals in Rural Areas of the United States

October 2012

This study was supported through the WWAMI Rural Health Research Center with funding from the federal Office of Rural Health Policy, Health Resources and Services Administration (Grant #5U1CRH03712-06-00).

WWAMI RURAL HEALTH RESEARCH CENTER

by

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ABOUT THE CENTER

The WWAMI Rural Health Research Center (RHRC) is one of seven centers supported by the Federal Office of Rural Health Policy (FORHP), a component of the Health Resources and Services Administration (HRSA). The major focus of the RHRC is to perform policy-oriented research on issues related to rural health care and the rural health professional workforce. Specific interests of the RHRC include the adequacy of the supply and education of rural health care professionals, and the availability and quality of health care for rural populations, with particular emphasis on access to high-quality care for vulnerable and minority rural populations.

The WWAMI Rural Health Research Center is based in the Department of Family Medicine at the University of Washington School of Medicine, and has close working relationships with the WWAMI Center for Health Workforce Studies, state offices of rural health, and the other health science schools at the University, as well as with other major universities in the five WWAMI states: Washington, Wyoming, Alaska, Montana, and Idaho. The University of Washington has over 30 years of experience as part of a decentralized educational research and service consortium involving the WWAMI states, and the activities of the RHRC are particularly focused on the needs and challenges in these states.

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Funded by the Federal Office of Rural Health Policy
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ACKNOWLEDGEMENTS

We would like to acknowledge the assistance of the following people who provided valuable input to the production of this report:

Roxanne Fulcher, Director, Health Professions Policy, American Association of Community Colleges, Washington, DC.

Anne Loochtan, PhD, RRT, Vice President of Academic Affairs and Dean of Faculty, Mercy College of Northwest Ohio, and Past-President, National Network of Health Career Programs in Two-Year Colleges.

Carolyn O'Daniel, EdD, RRT, Dean of Allied Health and Nursing, Jefferson Community and Technical College, Louisville, Kentucky, and President, National Network of Health Career Programs in Two-Year Colleges.

Randy Smith, PhD, President, Rural Community College Alliance, Olustee, Oklahoma.

And from the University of Washington WWAMI Rural Health Research Center, Brenda Hoskinson, Martha Reeves, and Denise Lishner all assisted with information gathering and production of this report.

The Contributions of Community Colleges to the Education of Allied Health Professionals in Rural Areas of the United States

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EXECUTIVE SUMMARY

BACKGROUND

Community colleges educate a significant portion of the nation's allied health workforce (including Health Information/Medical Records Technicians, Surgical Technologists, and Dental Assistants, to name a few), and because they have a history of educating residents of their communities for local jobs, are important to the economies of many rural communities. Many rural areas face shortages of health care providers, including shortages of allied health professionals. Promoting allied health career pathways in rural areas through collaboration among community colleges, rural health care employers, and rural community development organizations not only supports rural health care delivery but also supports the important goal of rural economic development.

PURPOSE

This study's purpose was to increase understanding of how community colleges contribute to allied health education and rural health care by (1) assessing which allied health occupations are most relevant to rural health care delivery and can be job-ready after completing an education program at a community college and (2) describing where these allied health community college programs were located in relation to rural populations and small rural hospitals across the United States in 2007-2009.

STUDY DESIGN AND DATA SOURCES

This is an ecological descriptive study using data from the Federal Integrated Postsecondary Education Data System, Flex Monitoring Team,

American Hospital Association, and U.S. Census Bureau. Bivariate analyses used ArcGIS and STATA software.

METHODS

Eighteen allied health occupations that can be attained through community college education programs were identified from among the National Center for Education Statistics' list of all non-nursing health professions and related clinical sciences programs as being the most relevant to rural health delivery based on discussions with national allied health and education experts: Dental Assistant, Dental Hygienist, Health Information/Medical Records Technician, Medical/Clinical Assistant, Occupational Therapist Assistant, Pharmacy Technician/Assistant, Physical Therapist Assistant, Veterinary/Animal Health Technician and Veterinary Assistant, Electrocardiograph Technician, Emergency Medical Technician/Paramedic, Nuclear Medical Technologist, Medical Radiologic Technologist/Science—Radiation Therapist, Respiratory Therapist, Surgical Technologist, Diagnostic Medical Sonographer/Ultrasound Technician, Radiologic Technology/Science—Radiographer, and Clinical/Medical Laboratory Technician. The locations of the community college programs were analyzed in relation to rural populations (for all 18 selected occupations) and also small rural hospitals in the United States (for 13 of the occupations that are employed by hospitals) by assessing the percent within 30- and 60-minute drives.

MAJOR FINDINGS

Depending on the profession, allied health professionals can obtain their education from four-year colleges and universities, at community and technical colleges, or on the job. Of the nearly 200,000 persons across the United States who completed a postsecondary program in 2007-2008 to prepare for these 18 rural-relevant allied health occupations, the majority (62%) did so at a community college (Table 1). Overall, 73% of the U.S. rural population (defined using Rural Urban Commuting Areas) resided within a 60-minute drive to any community college that educated one of 18 types of allied health professionals (83% of populations in large rural areas, 69% of small rural areas, and 56% of isolated small rural areas) compared with 99% of urban populations. Furthermore, access varied considerably by geographic region, with the West having the lowest percentage of their rural population within a 60-minute drive of one or more of the selected allied health programs (58%) and the Northeast having the highest percentage (90%). Rural populations had closer commuting access to some types of programs than others. For example, the percentage of rural populations within a 60-minute drive to a community college allied health program was highest for Medical/Clinical Assistants (55%), Emergency Medical Technicians/Paramedics (48%), and Surgical Technologists (45%) and lowest for Diagnostic Medical Sonographers/Ultrasound Technicians (21%), Nuclear Medical Technologists (12%), Cardiovascular Technologists (8%) and Electrocardiograph Technicians (2%). The study found that 55% of Critical Access Hospitals (CAHs) were within a 60-minute drive to a community college program with at least one hospital-relevant allied health education program, compared with 67% of small (fewer than 50 beds) non-CAH rural hospitals. Access varied considerably by geographic region. Only 3% of CAHs in the West were within a 60-minute drive to a Clinical/Medical Laboratory Technician community college program.

CONCLUSIONS

Rural communities in many areas of the country have limited access to a local community college source of education for allied health occupations. This is likely to be a barrier to recruiting, training, and retaining the health care workforce these communities need. Nearly half of CAHs and a third of all small rural hospitals do not have a local education source for one or more of the allied health occupations needed to deliver care in their facilities. Access to community college allied health professions education appears to be particularly limited in the West where population density is much lower and commuting times to community college programs are greater than in other regions of the United States.

POLICY IMPLICATIONS

This study provides information quantifying the geographic relationships between community college allied health education programs, rural populations, and health care facilities that employ allied health professionals. Rural communities can use these findings to help identify strategies to alleviate allied health workforce shortages. Strategies that these findings may inform include expanding the distribution of community college allied health education programs, building rural satellite programs that bring education programs closer to rural populations, increasing clinical training opportunities at community colleges, and increasing distance education opportunities for rural populations. Data on rural workforce demand and supply are scarce, but if these data were more widely available they could be used to measure the extent to which allied health gaps are associated with the rural community college "deserts" identified in this report (for example, if regions with few health information/medical records programs are regions struggling to meet Meaningful Use requirements). Information about effective collaborations between community colleges, health care employers, and rural communities may help better align the supply of and demand for allied health workers. Studies underway by the WWAMI Rural Health Research Center will, when complete, help to improve understanding of some of these issues.

The Contributions of Community Colleges to the Education of Allied Health Professionals in Rural Areas of the United States

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BACKGROUND

Rural health care facilities need adequate supplies of allied health care professionals, as well as adequate supplies of physicians, nurses, and dentists. Throughout the country, 23 different allied health occupations are projected to have double-digit growth between 2008 and 2018, driving a need for 2.45 million positions to cover this growth and replacement of workers who retire and leave the workforce.[1]

While workforce data specific to rural areas are lacking, supply and demand data for rural allied health professionals are especially scarce.[2] Nonetheless, there is sufficient anecdotal evidence and extrapolation from overall workforce demand estimates to recognize the need for more allied health workers in rural communities.[3] The National Rural Health Association (NRHA) in 2008 adopted policy designed to strengthen the allied health workforce pipeline by recruiting and retaining allied health professionals in rural communities. One strategy that the NRHA recommended centered on expanding and enhancing access to allied health educational opportunities for rural populations *(see sidebar)*. To carry out these strategies, information is needed about what allied health education and training programs are available and accessible to rural populations, where they are located, and how many people are completing these programs.

Community colleges are important to rural economic development because they have a history of educating residents of their communities for local jobs, and in many rural communities they are the only higher education institutions accessible to their populations.[4] There is increasing pressure on community colleges to prepare students to fill available nearby jobs by partnering with employers/industry, public and private agencies, professional organizations, potential

NATIONAL RURAL HEALTH ASSOCIATION POLICY POSITION: ALLIED HEALTH (EXCERPTS)

Strategies

"A team approach of educational institutions, health care providers and local, state, and federal government is needed to address the challenges in recruiting and retaining the necessary allied health professionals in rural communities. Examples of potential strategies to address the allied health workforce pipeline [include]…":

Educational Institutions

- Develop innovative interdisciplinary training programs to accommodate workforce needs in rural areas.
- Make training programs more accessible by using information technology or developing regionalized access points.
- Increase the number of faculty available to support the demand for training health professions students.
- Enhance and expand the availability of clinical training sites in rural settings.

Rural Health Facilities

- Partner with educational institutions to develop programs that will allow students to continue current employment and family responsibilities while enhancing their careers.
- Develop career ladder training programs.
- Partner with local economic development to create local opportunities.
- Partner with local Foundations and businesses to offer tuition reimbursement and loan repayment incentives.

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States

- Offer financial incentives to encourage allied health professionals to locate in rural underserved areas in the state.
- Provide capital resources necessary to fund distance education programs.
- Develop statewide career ladder training programs through campus and distance learning options.
- Support programs that link educational facilities and rural areas.

Source: National Rural Health Association. *National Rural Health Association policy position—workforce series: allied health.* Washington, DC: Government Affairs Office; 2008.

employees, and others to form ongoing relationships needed for regional economic development.[5] Education for many allied health occupations can be completed in community college programs, and because rural unemployment rates have rapidly increased since the recession began,[6] allied health occupations would seem to be excellent candidates for rural incumbent worker training to the extent they are accessible. Compared with other public education institutions, community college students represent a wider range of ages, are more racially and ethnically diverse, include incumbent workers as well as new workforce entrants, and have growing numbers of part-time students in contrast to previous decades.[7]

Rural communities, through programs often led and/or financed by rural hospitals, have found "grow your own" strategies (encouragement of local residents to enter health careers, often with incentives to practice in their home community) to be effective recruitment strategies for the rural health workforce.[3,8-10] "Grow your own" strategies are easiest to implement when the required education resources are located in or near the community, and community colleges are the most common education gateway to allied health occupations. Enhancing allied health career pathways in rural areas through collaboration among community colleges, rural health care employers, and rural community development organizations not only supports rural health care delivery but also supports the important goal of rural economic development.

OBJECTIVES

The overall goal of this study was to increase understanding of how community colleges contribute to allied health education and the allied health workforce by describing where programs were located in relation to rural populations and small rural hospitals across the United States in 2007-2009. Consistent data are not available to document shortages of allied health workers in rural areas of the United States,[2] so this study was intended to partially fill that gap by showing the extent to which community college allied health programs were located in proximity to rural populations and hospitals, and perhaps more importantly, the extent to which they are not located near rural populations and hospitals.

Specific objectives were to:

- identify community college education programs that produce allied health professionals most relevant to rural communities,
- show five-year trends in allied health program completions from community colleges,
- identify community college education programs that produce allied health professionals within close proximity (60- and 30-minute drives) to rural areas,
- identify community college education programs that produce allied health professionals within close geographical proximity to small rural hospitals, and
- explore the impact of distance education on allied health education in community colleges that serve rural populations.

ALLIED HEALTH PROFESSIONS AND RURAL COMMUNITIES

WHAT IS ALLIED HEALTH?

Health care delivery depends on many types of professionals, including those collectively called "allied health" professionals. There is not general agreement on a single list of professions covered under the term "allied health." While it is accepted that allied health professions do not include physicians, dentists, or nurses, other professions have been added or removed from the allied health list regularly over the past century. Over time, various individual professions such as physician assistants, physical therapists, occupational therapists, radiologic technologists, health information managers, and ophthalmic medical technologists/technicians have sought greater visibility and distanced their professions from the allied health label by forming their own accreditation bodies.[11] Distancing from the term "allied health" has tended to occur as individual professions require greater educational preparation, take on increasing practice independence, and as salaries rise. The Health Professions Network, a "collaborative group representing the leading allied health organizations,"

lists 46 featured professions on its website.[12] There are references to more than 85 occupations comprising the allied health workforce.[2] In 2010, the Commission on Accreditation of Allied Health Education Programs provided accreditation to 20 occupations.[13]

An allied health professional is defined within the Affordable Care Act (Public Law 111-148 and Public Law 111-152) simply as "an individual who graduated with an allied health professions degree or certificate, and is employed as an allied health professional in a health care setting" and references section 799B(5) of the Public Health Service Act (42 U.S.C. 295p(5)) which defines allied health as:

> *"a health professional (other than a registered nurse or physician assistant) who has received a certificate, an associate degree, a bachelor's degree, a master's degree, a doctoral degree, or postbaccalaureate training in a science related to health care; who shares in the responsibility for the delivery of healthcare services or related services, including services relating to the identification, evaluation, and prevention of disease and disorders, dietary and nutrition services, health promotion services, rehabilitation services, or health systems management services."*

For this study, our goal was to provide information about the allied health occupations most relevant to rural health care delivery that could be job-ready after completing an education program at a community college. Within these parameters, selecting "allied health" occupations is relatively non-controversial.

ALLIED HEALTH OCCUPATIONS MOST RELEVANT TO RURAL HEALTH CARE

Our source for potential allied health occupations to include in this study was the National Center for Education Statistic's *Classification of Instructional Programs* (CIP), 2000 edition.[14] CIP codes were updated in 2010 and were incorporated into the Integrated Postsecondary Education Data System (IPEDs) beginning in the 2010-2011 academic year, after this study's analyses were completed. We selected the "Health Professions and Related Clinical Sciences" programs (and related professions) that did not require graduate degrees from which professions for this study could be selected. To identify allied health occupations that contribute to the rural health workforce (including the medical, oral, and public health workforce), we solicited input from members of the Board of Directors of the National Network of Health Career Programs in Two Year Colleges. Together we identified 18 of the 82 total allied health professions from the CIP code list that (1) were likely to be employed in rural communities throughout the United States and (2) could be job-ready following completion of a community college education program (although some of the selected occupations could also be attained with higher degrees or through training in other settings). For example, Electroneurodiagnostic/Electroneurocephalographic Technologists could be trained at the community college level, but because so few would actually be employed in rural communities (because of their high degree of specialization) this occupation was not included in the analyses for this study. On the other hand, Dental Hygienists are frequently employed in rural areas and while some of these professionals are educated at the baccalaureate level, they can also be trained at the associate level through community colleges and, therefore, were included in the study. Appendix A shows the list of professions from which we selected the 18 most relevant to this study of community colleges' contributions to rural allied health workforce development and includes descriptions of the role and educational requirements of each selected allied health profession.

COMMUNITY COLLEGES AND ALLIED HEALTH EDUCATION

Educational requirements for allied health occupations range from on-the-job training or other training outside of an education institution to doctoral degrees. Some professions can be trained in multiple education settings. Among our 18 selected occupations (for which training may be completed at a community college and that are commonly employed in rural communities), some may also be attained through education paths other than the community college.

For this study, we identified the number of students completing allied health education programs ("completions") from data contained in IPEDS, from the U.S. Department of Education's National Center for Education Statistics. Details about institutional definitions and methods are included in Appendix D, "Technical Appendix: Community College Education Programs in Allied Health Occupations."

While the source of education/training for allied health programs may occur in locations other than community colleges, most of the institution-based education takes place in community colleges for the selected rural-relevant occupations. Table 1 shows that just two occupations, Diagnostic Medical Sonographer/Ultrasound Technician and Cardiovascular Technologist, derived fewer than half of their completions (among those educated in postsecondary education institutions) from community colleges in academic year 2007-2008. Across all selected rural-relevant allied health occupations in 2007-2008, nearly 62% of completions (119,597 out of 193,415) from programs in postsecondary institutions came from community colleges, and for some, such as

Table 1. Number and Percent of 2007-2008 Program Completions from Community Colleges and Other Postsecondary Institutions, Academic Year 2007-2008*

"Rural-Relevant" Allied Health Occupations*	Total Number of Program Completions†	% from Community Colleges	% from Non-Degree Granting Institutions	% from Degree Granting (Primarily Baccalaureate or Above) Institutions
Medical/Clinical Assistant‡	75,016	**50.3%**	49.1%	0.6%
Emergency Medical Technician/Paramedic‡	20,469	**85.6%**	11.6%	2.8%
Dental Assistant‡	18,219	**51.7%**	47.2%	1.1%
Pharmacy Technician/Assistant‡	12,774	**57.4%**	42.5%	0.1%
Medical Radiologic Technology/Science—Radiation Therapist	9,458	**66.8%**	13.2%	20.0%
Surgical Technologist‡	8,679	**72.1%**	26.0%	2.0%
Dental Hygienist	7,217	**68.4%**	0.0%	31.6%
Respiratory Therapist	6,844	**81.1%**	1.7%	17.2%
Radiologic Technology/Science—Radiographer	6,652	**67.6%**	12.7%	19.7%
Health Information/Medical Records Technician	5,571	**78.4%**	11.2%	10.4%
Diagnostic Medical Sonographer/Ultrasound Technician	4,851	**44.6%**	43.7%	11.7%
Veterinary/Animal Health Technician and Veterinary Assistant	4,789	**84.6%**	6.6%	8.8%
Physical Therapist Assistant	4,548	**81.7%**	8.0%	10.3%
Clinical/Medical Laboratory Technician‡	3,175	**75.7%**	3.6%	20.8%
Occupational Therapist Assistant	1,997	**88.2%**	1.2%	10.6%
Cardiovascular Technician/Technologist‡	1,755	**38.2%**	57.2%	4.6%
Nuclear Medical Technologist‡	1,203	**59.4%**	1.9%	38.7%
Electrocardiograph Technician‡	198	**92.9%**	7.1%	0.0%
Total completions, 2007-2008	**193,415**	**119,597**	**62,305**	**11,525**
Percent of completions	**100%**	**61.8%**	**32.2%**	**6.0%**

* Note that training programs not based in postsecondary institutions (i.e., not in the IPEDS) will not be included in this table, and therefore this table does not represent all persons completing education for these occupations in 2007-2008.

† All completions, regardless of proximity to rural or urban populations.

‡ Training for this profession also may be obtained at, or outside of, an academic institution with no degree or certificate conferred. The number obtaining training in this manner are not reflected in the completion data in this table.

Source: Integrated Postsecondary Education Data System, National Center for Education Statistics, U.S. Dept. of Education.

EMT/Paramedics, Respiratory Therapists, and Physical Therapist Assistants, the completions from community colleges exceeded 80%. Nearly 80% (78.4%) of Health Information/Medical Records Technician program completions from postsecondary institutions were from community colleges. Data were not available to allow us to determine how many students completing allied health education programs were from, or are now working in, rural areas. Because community colleges are generally more accessible to rural residents than are four-year and higher institutions and for-profit technical training institutions, we presumed that the majority of education for these occupations among rural allied health providers occurred in community colleges.

The number of completions increased from 2003-2008 for all of the 18 selected allied health education programs except Cardiovascular Technology and Electrocardiography. The occupations with the largest increase included Occupational Therapist Assistants, Nuclear Medical Technologists, Respiratory Care Therapists, and Radiographers. Appendix B shows the five-year completion trends for each of these 18 allied health education programs as well as the number of these community college programs available in each region of the United States.

COMMUNITY COLLEGE ALLIED HEALTH PROGRAMS AND PROXIMITY TO RURAL POPULATIONS

RURAL-RELEVANT ALLIED HEALTH PROGRAMS AND RURAL POPULATIONS

Figure 1 shows the location of community colleges across the United States, distinguishing between those that did and did not provide[a] one or more of the 18 rural-relevant allied health programs (as shown in Table A-1) between 2007 and 2009.[b] Schools providing these programs represented 69%, or 1,514 out of 2,185, of the nation's community colleges.

The proximity of the colleges to rural and urban populations in the regions is illustrated on the map. Rural populations falling within drive times of 30 and 60 minutes of these community colleges were calculated using methods described in Appendix D.

a. "Provided" = the institution reported to IPEDS that students completed the program in at least one of the years.
b. Note that at the time of these analyses, IPEDS information about community college programs was available through 2009 but data on numbers of individuals completing programs was available only through 2008.

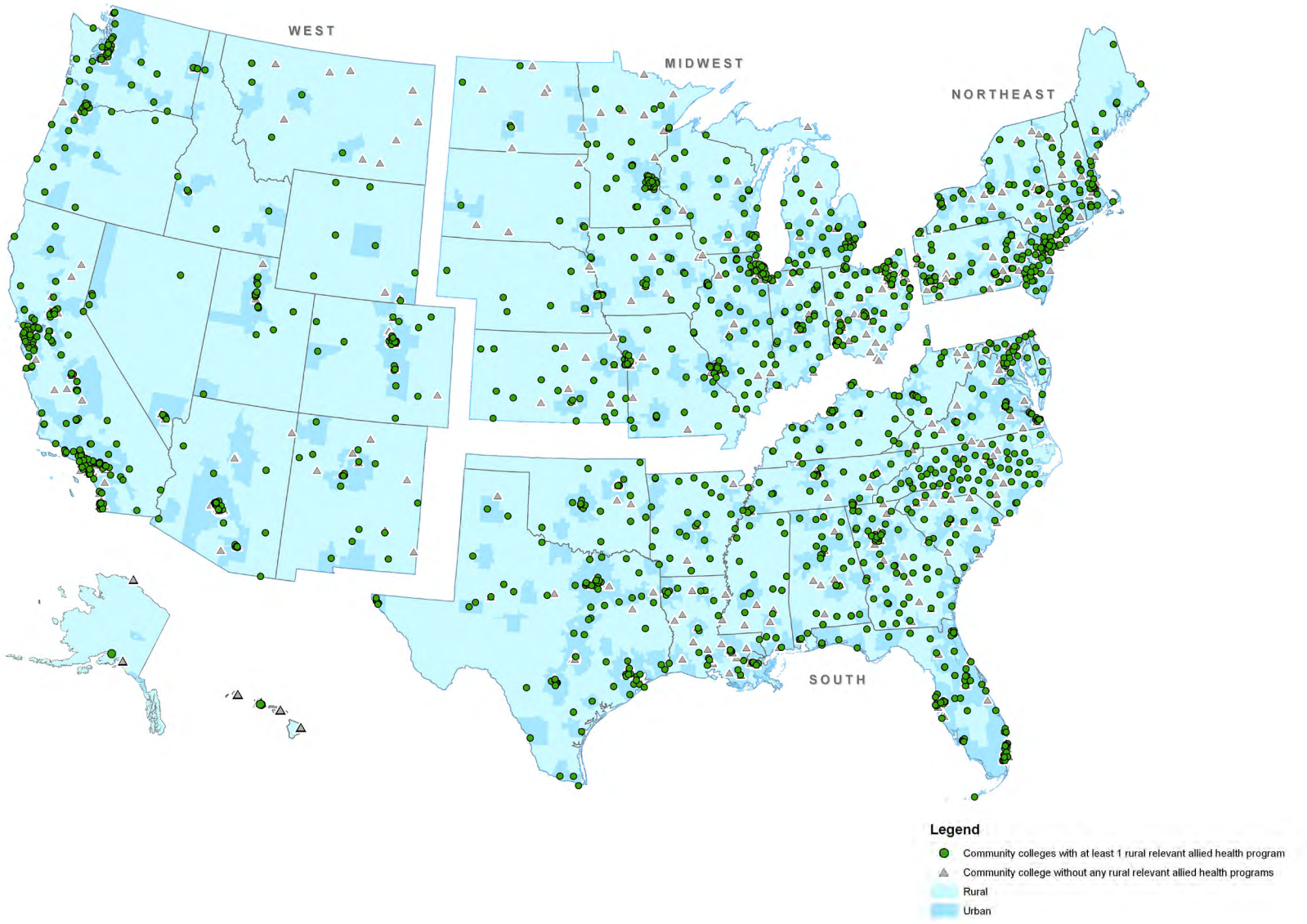
The 30-minute threshold was included in the analyses because many community colleges cite being within 30 minutes of their students as an indicator of providing good community access and as a factor that encourages students to enroll.[15-18] In 2009 the mean travel time to work in the United States was 25.1 minutes,[19] further emphasizing the significance of the 30-minute drive time. While our analyses found that over 90% of urban populations were within a 30-minute drive to one of the 18 selected allied health education programs, a much smaller percentage (35.3%) of rural populations were within a 30-minute drive. This is particularly striking for residents of less populated rural areas where only 13.5% of residents in isolated small rural areas were within a half hour drive to any program in the country overall; in the West only 9.4% were within a 30-minute drive. We report the more conservative 60-minute drive time proximities to education programs in the following narrative because rural residents frequently experience long commutes for work, shopping, and other needs. Tables showing 30-minute drive time data can be found in Appendix B.

The number and percent of rural populations that were within a 60-minute drive to one or more of the rural-relevant allied health programs between 2007 and 2009 are shown in Table 2. While nearly all urban areas of the United States were within a 60-minute drive to a

Table 2. Rural Populations within a 60-Minute Drive of One or More Rural-Relevant Community College Allied Health Programs (2007-2009)

Population within a 60-Minute Drive of a Community College Allied Health Program	Area Type					
				Rural Sub-categories		
	Total	Urban	Rural Overall	Large Rural	Small Rural	Isolated Small Rural
Total United States						
Number (in millions)	293.0	246.7	45.3	25.2	11.5	8.6
% (within area type)	95.3%	99.3%	78.2%	86.8%	75.8%	62.7%
Census region						
West						
Number (in millions)	66.5	7.0	5.6	3.6	1.2	0.8
% (within area type)	93.4%	99.0%	57.7%	71.0%	49.6%	35.2%
Midwest						
Number (in millions)	63.9	50.3	13.6	7.3	3.6	2.7
% (within area type)	94.5%	99.5%	79.7%	89.7%	80.2%	61.1%
South						
Number (in millions)	106.7	86.3	20.4	10.9	5.7	3.8
% (within area type)	95.3%	99.1%	82.2%	88.8%	80.3%	69.8%
Northeast						
Number (in millions)	54.9	49.2	5.7	3.4	1.0	1.3
% (within area type)	98.8%	99.9%	89.8%	96.2%	86.7%	78.6%

Figure 1. Locations of Community Colleges with and without Rural-Relevant Allied Health Education Programs (2007-2009) and Proximity to Rural and Urban Areas, by Census Region



community college with at least one of these selected allied health education programs, it is not surprising that a smaller percentage (78.2%) of rural populations were within an hour drive to one or more of these programs. The analyses also document that residents of less populated rural areas are farther, on average, from allied health community college programs than residents of more populated rural areas. Rural populations in the West census region face the greatest commuting distances to community college allied health programs: on average just 58% of rural residents overall were within an hour drive to a program and only 35% of those in isolated rural areas were within an hour drive to a program.

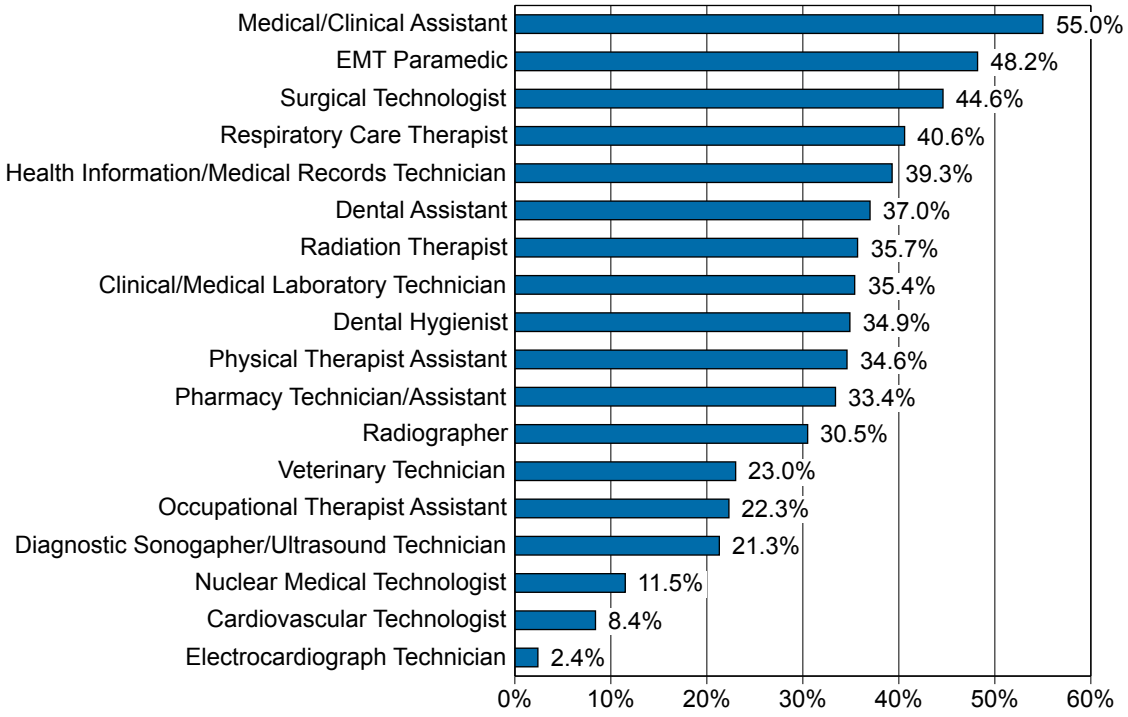
Appendix B also shows full details on the percentage of rural and urban populations that were within 60-minute and 30-minute drives to each of the 18 selected rural-relevant allied health occupations, as well as the number and location of programs nationwide.

WHICH COMMUNITY COLLEGE ALLIED HEALTH PROGRAMS ARE MORE COMMONLY LOCATED NEAR RURAL POPULATIONS?

Because there is greater demand for some occupations than others, the availability of specific types of allied health community college education programs varies. Figure 2 shows the list of rural-relevant allied health education programs, ranked in order of the percentage located within a 60-minute drive of rural populations. Programs for Medical/Clinical Assistants (55.0%), Emergency Medical Technicians/Paramedics (48.2%), and Surgical Technologists (44.6%) had the highest percentage of rural populations within a 60-minute drive.

Across different regions of the country, the rankings of community college programs' proximity to rural populations differed. As shown in Table 3, in the West and South regions a higher percentage of rural residents were within an hour drive of an EMT/ Paramedic community college program than they were

Figure 2. Percent of U.S. Population in Rural Areas that Had Community College Allied Health Education Programs* within a 60-Minute Drive, by Program Type, 2007-2009



*Among allied health occupations most frequently employed in rural settings.

Table 3. Percent of Rural Populations within a 60-Minute Drive of a Rural-Relevant Community College Allied Health Education Program, 2007-2009, By Census Region

Community College Allied Health Occupation Education Program	Rural Populations within a 60-Minute Drive of the Allied Health Program (Top 5 in Bold)			
	West	Midwest	South	Northeast
Medical/Clinical Assistant	**39.7%**	**58.6%**	**53.9%**	**73.3%**
Emergency Medical Technician/Paramedic	**43.8%**	25.1%	**63.7%**	**55.8%**
Surgical Technologist	18.5%	**46.7%**	**53.6%**	43.2%
Respiratory Therapist	18.1%	**38.1%**	**49.3%**	47.4%
Health Information/Medical Records Technician	19.7%	**42.5%**	42.3%	**48.4%**
Dental Assistant	**33.1%**	**39.0%**	36.9%	37.6%
Medical Radiologic Technology/Science—Radiation Therapist	11.5%	31.5%	45.0%	47.3%
Clinical/Medical Laboratory Technician	4.4%	35.5%	**46.4%**	39.6%
Dental Hygienist	22.1%	36.0%	36.6%	45.3%
Physical Therapist Assistant	6.1%	33.7%	39.2%	**62.5%**
Pharmacy Technician/Assistant	**27.2%**	31.2%	40.0%	23.2%
Radiologic Technology/Science—Radiographer	18.6%	29.1%	34.4%	37.0%
Veterinary/Animal Health Technician and Veterinary Assistant	**23.8%**	27.9%	17.4%	30.4%
Occupational Therapist Assistant	4.4%	27.1%	18.8%	**49.9%**
Diagnostic Medical Sonographer/Ultrasound Technician	6.6%	19.3%	25.6%	32.0%
Nuclear Medical Technologist	1.1%	11.9%	14.3%	15.6%
Cardiovascular Technologist	0.8%	4.2%	11.7%	18.4%
Electrocardiograph Technician	1.4%	5.7%	0.8%	1.1%

to a Medical/Clinical Assistant program (which has the highest rank nationally). In the Midwest and Northeast, Medical/Clinical Assistant programs rank highest, while Surgical Technology/Technologist programs are the second most proximal to rural populations in the Midwest region, and Physical Therapist Assistant programs are the second highest ranking in the Northeast.

SMALL RURAL HOSPITALS' PROXIMITY TO ALLIED HEALTH COMMUNITY COLLEGE PROGRAMS

Hospitals employ many of the health professionals educated in community colleges, and they provide a major portion of the health care delivered in rural areas. In the absence of nationwide rural workforce demand data for allied health occupations, one goal of this study was to spatially locate the sources of workforce supply in relation to this important demand sector—rural hospitals.

We sought to identify which small rural hospitals were within a 60-minute drive of community colleges offering allied health education programs and to examine regional variations in geographic access using this indicator. For these analyses we examined only allied health programs relevant to the rural hospital setting, as shown in Table 4, which were a subset of 13 of the 18 rural-relevant allied health occupations in this study. Specifically, oral health occupations,

Table 4. Allied Health Occupations Commonly Employed by Small and Rural Hospitals

Cardiovascular Technologist
Clinical/Medical Laboratory Technician
Diagnostic Medical Sonographer/Ultrasound Technician
Electrocardiograph Technician
Health Information/Medical Records Technician
Nuclear Medical Technologist
Occupational Therapist Assistant
Pharmacy Technician/Assistant
Physical Therapist Assistant
Radiation Therapist
Radiologic Technology/Science—Radiographer
Respiratory Therapist
Surgical Technologist

Medical/Clinical Assistants (who primarily work in ambulatory care settings), and Veterinary Technicians were excluded. All hospitals with 49 or fewer beds located in rural areas of the United States were identified, consistent with the federal Office of Rural Health Policy's small hospital definition for the Small Rural Hospital Improvement Grant Program (having 49 available beds or less, as reported on the hospital's most recently filed Medicare Cost Report). This definition of small hospitals includes Critical Access Hospitals (CAHs), which are important to rural communities both for health care access and employment. CAHs have been established through the Medicare Rural Hospital Flexibility Grant Program (Flex Program) for the purpose of strengthening rural healthcare infrastructure. CAHs must meet several requirements, including being located in a rural area,[c] having a maximum of 25 acute care and swing beds, and in most cases, being located more than 35 miles from another hospital.[d]

We obtained lists of hospitals meeting these criteria and their addresses from two sources, as described in Appendix D. This analysis examined all 1,700 small rural hospitals and separately analyzed 1,309 CAHs and 391 non-CAH small rural hospitals.

Using similar GIS methods as we used to associate rural populations with community college allied health education programs (see Appendix D), we identified CAHs and other small rural hospitals that were within a 60-minute drive of one or more community college allied health education programs (among those programs training the rural hospital-relevant occupations listed in Table 4). Figure 3 shows the locations of CAHs; Figure 4 shows small rural hospitals that are not CAHs.

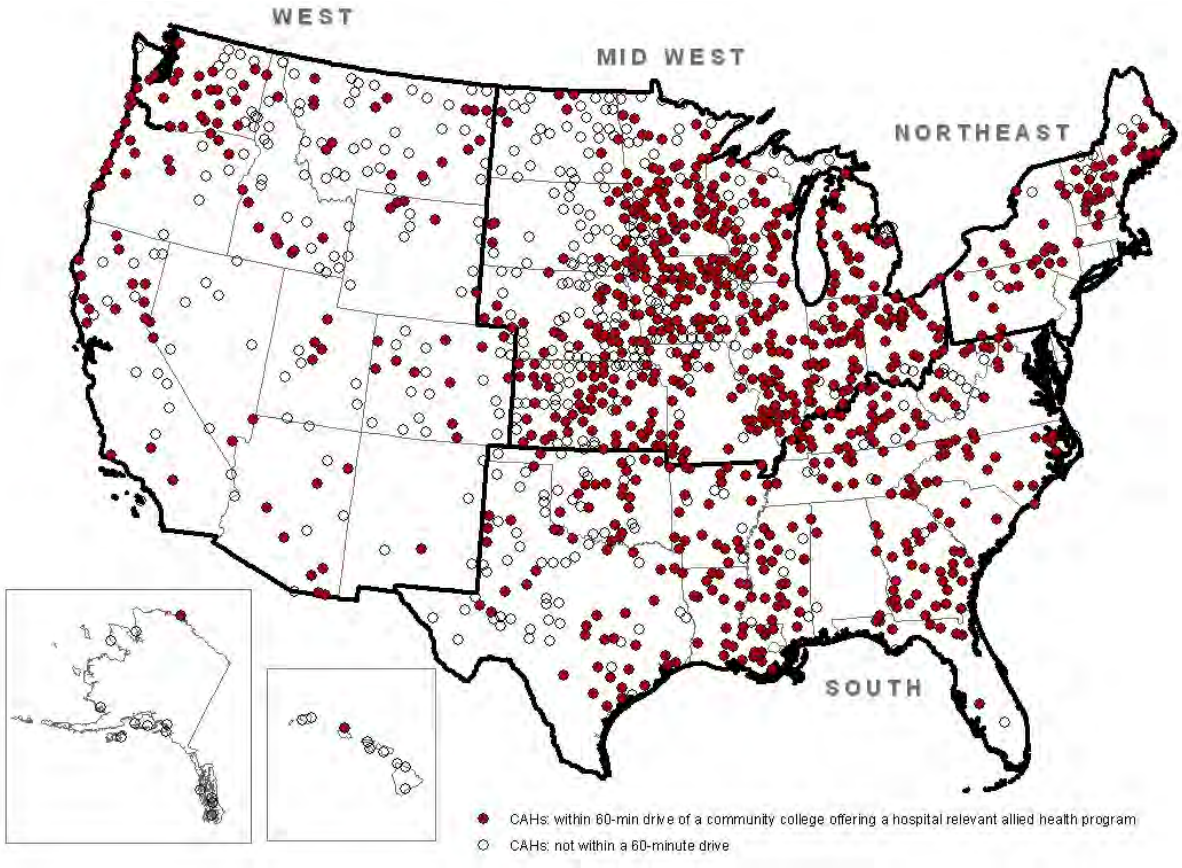
The study found that across the entire United States, 55% of CAHs were within a 60-minute drive to a community college program with a hospital-relevant allied health education program, compared with 67% of small (fewer than 50 beds) non-CAH rural hospitals (see Table 5). Less than half of all small rural hospitals were within a 60-minute drive to any specific occupational program. In fact, for any one allied health program type, the range was 2%-36% of hospitals that were located within a 60-minute drive of that program. For example, less than a third (28.2%) of CAHs were located within 60 minutes of a Clinical/Medical Laboratory Technician program at a community college compared with 33% of non-CAH small rural hospitals.

Regional differences in rural hospitals' proximity to allied health education programs are detailed in Appendix C. The West region had the smallest percentage of small rural hospitals (both CAHs and non-CAHs) within an hour drive of one of the selected community college allied health programs. Only 3% of CAHs in the West were within a 60-minute drive to a Clinical/Medical Laboratory Technician community college program, compared with 30% in the Midwest, 45% in the South, and 28% in the Northeast.

c. As defined by Social Security Act, Title XVIII, Section 1886 (http://www.socialsecurity.gov/OP_Home/ssact/title18/1886.h5m#act-1886-d-2-d, accessed October 7, 2010), a rural area is any area outside of a Metropolitan Statistical Area; CAHs can also be located in urban areas that are treated as rural according to certain requirements.

d. From the Flex Monitoring Team website (http://www.flexmonitoring.org/aboutcahflex.shtml, accessed October 7, 2010): CAHs must be "more than 35 miles (or 15 miles in areas with mountainous terrain or only secondary roads available) from another hospital or be certified before January 1, 2006, by the State as being a necessary provider of health care services. CAHs are required to make available 24-hour emergency care services that a State determines are necessary. CAHs may have a maximum of 25 acute care and swing beds, and must maintain an annual average length of stay of 96 hours or less for their acute care patients. CAHs are reimbursed by Medicare on a cost basis (i.e., for 101% of the reasonable costs of providing inpatient, outpatient and swing bed services)."

Figure 3. Critical Access Hospitals (CAHs) Located within a 60-Minute Drive of a Community College Allied Health Education Program*



* Among 13 allied health occupations most relevant to rural hospitals.

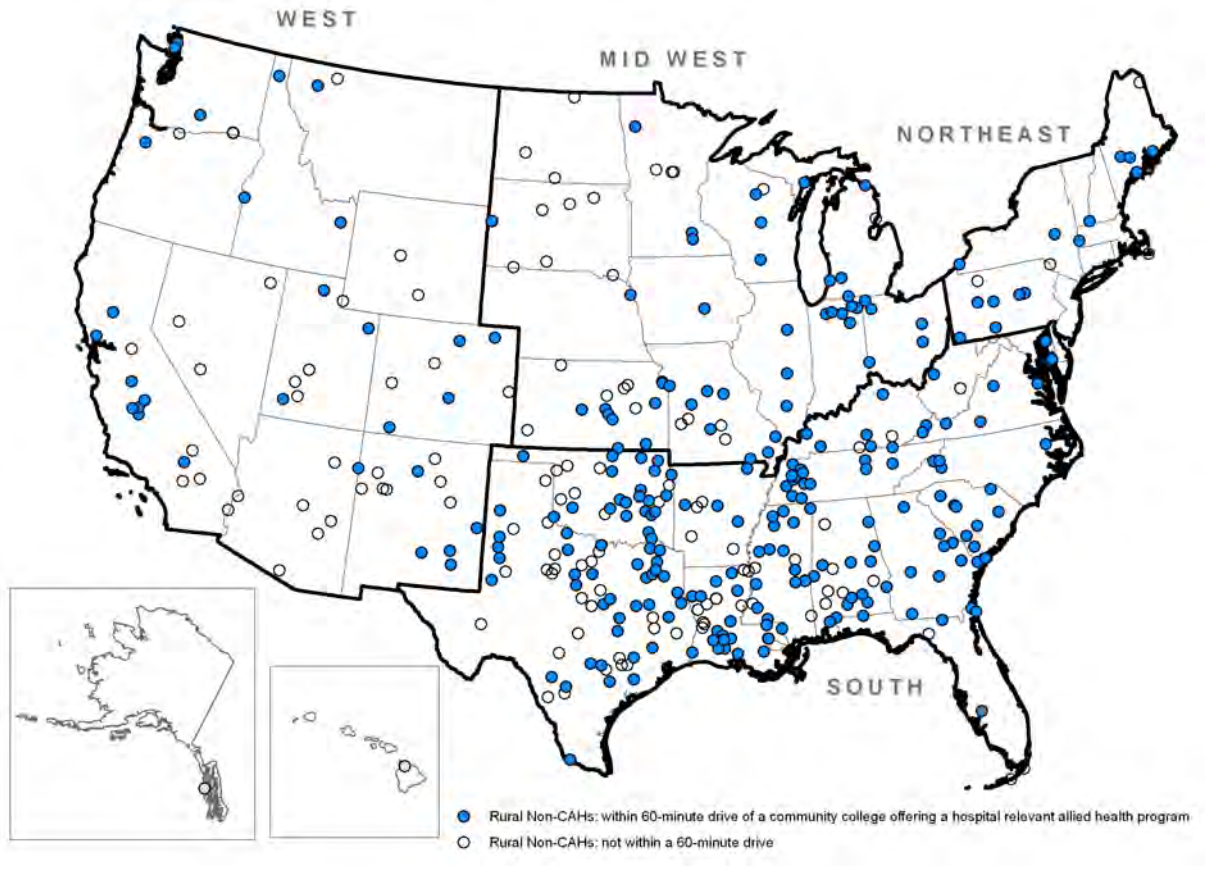
EXPLORING USE OF DISTANCE EDUCATION TO EXPAND RURAL ACCESS TO ALLIED HEALTH CAREERS

Delivering allied health programs to rural residents through distance education, such as by online learning, is one way to extend the reach of community college programs. While growing numbers of programs are using hybrid in-person and web-based curricula for health care professions education, rural community college students have few opportunities to complete entire allied health education programs online.[e] Most pre-professional allied health programs currently require that students spend at least some of their time in community college classrooms.

Four major reasons help to explain why allied health distance education opportunities are limited. First, community colleges have a long history of being committed to community service, are seen as partners for regional economic growth, and are reluctant to reach into another community college coverage area to recruit students.[5] Second, health careers education requires clinical training sites in order for students to obtain needed clinical training experiences. These sites are difficult to coordinate when students are not in the same community as the education institution. Third, the transition to online learning also requires change in faculty and academic culture. Course development, content, and teaching methods have traditionally been

e. Personal communication with key informants with expertise in rural community college and health care curriculum issues, including: Carolyn O'Daniel, EdD, RRT, President, National Network of Health Career Programs in Two-Year Colleges; Roxanne Fulcher, Director, Health Professions Policy, American Association of Community Colleges, Washington, DC; Anne Loochtan, PhD, RRT, Past-President, National Network of Health Career Programs in Two-Year Colleges; and with individual community college health program representatives contacted at conferences and meetings where versions of this report were presented.

Figure 4. Small (<50 Beds) Non-CAH Rural Hospitals Located within a 60-Minute Drive of a Community College Allied Health Education Program*



* Among 13 allied health occupations most relevant to rural hospitals

determined by faculty and departments who progress toward new technology only as time and incentives allow.[20] And fourth, there remains a "digital divide" between the computer literate and those who lack computing skills and/or Internet access. The majority of those lacking computing resources are from the populations more likely to attend community college: racial/ethnic minorities and first-generation college students.[21] The digital divide is exacerbated in rural areas where access to the Internet and broadband service continues to lag behind urban and suburban areas.[4,22]

In recent years, community college leaders have championed innovation, including more and better use of Internet technology, to adapt to the changing needs of their constituents.[21,23] Enrollment in distance education programs at community colleges is growing. A recent study by the Instructional Technology Council reported a 22% increase from 2007-2008 to 2008-2009, attributed in part to the impact of the economic downturn.[24] Students usually can access online courses at flexible times, which is appealing to job seekers and to those who are employed but who want additional education and cannot accommodate strict class schedules.

Few community college health careers programs have been adapted to distance education programs, however. An example of a pre-licensure RN distance education programs that allows place-bound students to obtain an associate degree in nursing is the Rural Outreach in Nursing Education program in Washington State.[25] There are many private technical schools offering associate degrees in health-related careers, but these are mostly limited to office management, medical records and health information management, and medical assisting. More information is needed about which distance education approaches are the most effective for preparing allied health professionals, especially for rural students.

Table 5. Small (<50 Beds) Rural Hospitals within a 60-Minute Drive of Community College Allied Health Programs*

Allied Health Occupations Commonly Employed in Rural Hospitals	Percent of Hospitals within a 60-Minute Drive to One or More Hospital-Relevant Allied Health Programs (Top 5 in Bold)		
	All Small Rural Hospitals	Critical Access Hospitals (CAHs)	Other Small Rural Hospitals (Not CAHs)
All rural-relevant hospital allied health occupations	58.5%	54.7%	66.8%
Individual occupations (top 5 in bold)			
Surgical Technologist	**35.9%**	**33.2%**	**44.8%**
Health Information/Medical Records Technician	**31.1%**	**29.9%**	**35.0%**
Respiratory Therapist	**30.5%**	**28.0%**	**38.9%**
Clinical/Medical Laboratory Technician	**29.2%**	**28.2%**	**32.5%**
Radiation Therapist	**25.7%**	23.3%	**33.8%**
Pharmacy Technician/Assistant	25.6%	**24.8%**	28.4%
Physical Therapist Assistant	25.4%	24.0%	29.9%
Radiographer	24.5%	24.2%	25.6%
Diagnostic Medical Sonographer/Ultrasound Technician	15.1%	15.0%	15.3%
Occupational Therapist Assistant	14.9%	14.3%	17.1%
Nuclear Medical Technologist	7.1%	7.1%	7.2%
Cardiovascular Technologist	5.8%	5.7%	6.1%
Electrocardiograph Technician	1.6%	1.9%	0.5%

* Among allied health occupations most relevant to rural hospitals.

STUDY LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

One of the largest limitations of this study is the lack of rural health workforce demand and job vacancy data to clarify the context of these descriptive findings. The U.S. Department of Labor's Bureau of Labor Statistics currently does not provide employer survey data from which job vacancy rates can be assigned to specific rural areas. HRSA's National Center for Health Workforce Analysis is building health workforce planning resources that in the future may provide some of the needed demand data. If demand and vacancy data were available nationally at the occupation level and for rural areas, we could examine whether areas with fewer community college allied health programs have higher vacancy rates. Nonetheless, the findings from this study provide a starting point for further examination of the impact of gaps in the availability of allied health community college programs.

The use of 60- and 30-minute commute times for our analyses may be more relevant in some areas than others. For example, commute times could vary significantly throughout the year in rural communities with large winter snowfall or frequently iced-over roads. In the absence of literature about commuting patterns of rural populations for education purposes, we chose to use these travel time cutoffs based on U.S. Census commuting data and because the 30-minute drive time threshold is commonly cited by community colleges as a measure that encourages enrollment and indicates good community access. Because the commitment to an education program is short term and rural residents often travel long distances for work, shopping, and other needs, we presumed that many rural residents in education programs would be tolerant of longer commutes and conducted our analyses using both the more conservative 60-minute drive time as well as the 30-minute measure.

The IPEDs database does not provide information about whether the listed institutions have satellite campuses or are satellites of a larger institution. If some community colleges in rural areas are satellite campuses of an institution based in an urban area, this study's findings may underestimate rural coverage of education programs because the institution's allied health programs would have been assigned to the main urban campus location. Future research providing this information would be very useful.

Finally, our analyses do not account for allied health distance education programs based in community colleges that might be available to rural communities

because data for such analyses are not available. Identifying these programs, to the extent they exist, was beyond the resources and scope of this study but would be valuable as a future study. If more distance education programs were available, the issue of physical proximity (i.e., being within a 60-minute commute time) would be less relevant.

CONCLUSIONS

Community colleges educate the majority of the allied health professionals necessary for rural health care delivery: in the academic year 2007-2008, 62% of students completing postsecondary education programs in the 18 rural-relevant allied health fields identified for this study completed their program in a community college. These rural-relevant allied health professions include occupations for which jobs can be found in ambulatory and hospital medicine, public health, and in oral health work sites.

Many rural populations do not have an allied health community college education program within a one-hour drive, which increases the number of obstacles that must be overcome for rural students to enter health care careers. This is another factor that may contribute to the difficulties many rural communities face in finding the health care workforce needed for their hospitals and clinics. The results of this study indicate that the majority of the allied health professionals employed by small rural hospitals have been educated more than an hour away, even for some of the most commonly employed occupations such as Clinical/Medical Laboratory Technicians and Surgical Technologists. This undoubtedly increases the difficulty and expense of recruitment.

Community college allied health programs for Medical/Clinical Assistants, EMT Paramedics, and Surgical Technologists are the most commonly accessible (i.e., within a one-hour drive) by rural residents across the nation. However, the regional variation in population proximity to allied health education is great: most rural communities (90%) in the Northeast are within a one-hour commute to a rural-relevant allied health community college program compared with only 58% of those in the West.

POLICY IMPLICATIONS

Rural students interested in allied health careers can and do travel to more highly populated areas to obtain their education. Among the risks of traveling greater distances for education, however, are that students will find employment in the distant community and not return to their rural home, or they will not complete (or never start) the education program due to the high expense and inconvenience of commuting. Greater access to community college allied health programs would help rural communities "grow their own" allied health workforce, but expanding this access is not easy. Barriers include the high expense of health occupations education due to the need for training laboratory facilities, shortages of qualified faculty, and limited access to clinical training sites. In order to hire faculty with the required clinical background, educational institutions must compete against the higher pay that qualified candidates can receive working in their clinical fields at health care facilities. In addition, many rural schools do not have the student volume to offer a specific health career's program every year, which causes disruption in faculty employment. Finding adequate numbers and types of clinical training sites is often problematic in rural health care facilities due to low patient volumes and fewer teaching/preceptor resources (i.e., numbers of clinical faculty as well as reimbursement for preceptor teaching time) than in large urban facilities. Allied health training programs also may compete with other health careers programs, such as nursing, for clinical training sites. Approaches that help rural communities overcome these barriers should continue to be pursued, including coordinating resources among communities, educational institutions, employers, and through distance education.

Collaboration between community colleges and employers is recognized to be important for community economic stability and growth.[5] In health care fields, such collaborations can conserve limited resources by addressing specific industry workforce needs while at the same time helping to ensure that jobs exist for students who commit financial, time, and family resources to their education. Greater collaboration between health care institutions and community college Health Information/Medical Records Technician programs (where 78% of the occupation's postsecondary education was occurring in 2007-2008) may help the institutions meet Meaningful Use deadlines that begin in 2014. Effective collaboration and partnerships, however, need to be nurtured and require leadership as well as financial resources. Community colleges face many competing demands, which can be especially taxing for the small institutions in or near rural areas. According to one expert in the field, "the best institutions merge an applied higher education with extension-like services for local industry."[7] But the

missions of rural community colleges keep expanding and expectations increase as they deal with the challenges of competition from for-profit educational institutions, work to meet the needs of growing student diversity, address continually changing credential requirements, and adapt to a rapidly changing digital environment. Identifying models of successful rural education-industry-community collaboration, as well as support for inter-college networking to encourage peer learning and replication, would be valuable resources for developing the allied health workforce in rural communities throughout the United States.[4] U.S. Department of Labor-funded Workforce Investment Boards, HRSA-funded Area Health Education Centers, and other entities with rural workforce development as part of their mission should be included among the partners in these efforts. HRSA's Rural Health Network Development Planning Grant Program and state offices of rural health could be considered as possible vehicles to provide technical assistance and coordination to promote these partnerships.

Distance education, which is delivered primarily through the Internet, is one of the most promising methods to bridge the gap between rural students and available allied health community college programs. Distance courses have the potential to increase enrollment and improve the financial stability of allied health programs. At the same time, distance education introduces new issues to confront such as the need for students to have Internet access and computer literacy, and for faculty to have curriculum and teaching skills adapted to distance education. Models of effective distance education in health careers exist in public institutions, although the majority are delivered by private, entrepreneurial technical institutes and career colleges. While community colleges have traditionally tended to limit their scope to sub-state regions, there have been some recent moves toward more centralization and cooperation among community colleges within states in ways that support distance education networks.[20] Florida, Texas, and Kentucky have developed distance learning programs that allow for sharing of information and course enrollments across colleges within each state. To be successful, such programs must resolve how inter-institution programs are funded, for example, as a student in one jurisdiction "attends" distance courses delivered by a community college in another jurisdiction. Research to identify successful models of collaboration in distance education, and resources to disseminate that information, should be encouraged so that the evidence can be applied to allied health education and rural settings.

This study's findings provide information for education planners, health care providers, and policymakers about geographic areas and disciplines where access to allied health education could be enhanced to better serve rural populations. While more data on rural allied health supply and demand are needed to further pinpoint gaps in the workforce and the extent to which gaps are associated with the rural community college "deserts" identified in this report, the quantitative information provides significant detail about the allied health occupations most relevant to rural health care delivery, the location of these education programs, and their proximity to rural populations. Studies underway by the WWAMI Rural Health Research Center will, when complete, further expand our understanding of some of the issues that affect rural residents' access to allied health education. One study is examining the extent to which distance education is being used by community college health information/medical records programs and describing rural student involvement in those programs. Additional Center studies are examining barriers to providing distance education and rural training opportunities for other health professions. These research findings will help rural communities that are experiencing allied health workforce shortages be better equipped to pursue expansion of allied health education programs, funding for health careers pipeline programs, and greater access to distance education opportunities.

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APPENDIX A. COMMUNITY COLLEGE EDUCATION PROGRAMS IN ALLIED HEALTH CAREERS

A-1. CIP Codes for Allied Health Programs/Professions Indicating Those Selected as Rural-Relevant Professions

Classification of Instructional Programs (CIP), 2000 (not including program categories for which all programs require post-graduate education)	Selected for Inclusion in Study*
51.02 Communication Disorders Sciences and Services	
51.0201 Communication Disorders, General	
51.0202 Audiology/Audiologist and Hearing Sciences	
51.0203 Speech-Language Pathology/Pathologist	
51.0204 Audiology/Audiologist and Speech-Language Pathology/Pathologist	
51.06 Dental Support Services and Allied Professions	
51.0601 Dental Assisting/Assistant	●
51.0602 Dental Hygiene/Hygienist	●
51.0603 Dental Laboratory Technology/Technician	
51.07 Health and Medical Administrative Services	
51.0706 Health Information/Medical Records Administration/Administrator	
51.0707 Health Information/Medical Records Technology/Technician	●
51.0708 Medical Transcription/Transcriptionist	
51.0709 Medical Office Computer Specialist/ Assistant	
51.0710 Medical Office Assistant/Specialist	
51.0711 Medical/Health Management and Clinical Assistant/Specialist	
51.0712 Medical Reception/Receptionist	
51.0713 Medical Insurance Coding Specialist/Coder	
51.0714 Medical Insurance Specialist/Medical Biller	
51.0715 Health/Medical Claims Examiner	
51.0716 Medical Administrative/Executive Assistant and Medical Secretary	
51.0717 Medical Staff Services Technology/ Technician	
51.08 Allied Health and Medical Assisting Services	
51.0801 Medical/Clinical Assistant	●
51.0802 Clinical/Medical Laboratory Assistant	
51.0803 Occupational Therapist Assistant	●
51.0805 Pharmacy Technician/Assistant	●
51.0806 Physical Therapist Assistant	●
51.0808 Veterinary/Animal Health Technology/ Technician and Veterinary Assistant	●
51.0809 Anesthesiologist Assistant	
51.0810 Emergency Care Attendant (EMT Ambulance)	
51.0811 Pathology/Pathologist Assistant	
51.0812 Respiratory Therapy Technician/Assistant	
51.0813 Chiropractic Assistant/Technician	

Classification of Instructional Programs (CIP), 2000 (not including program categories for which all programs require post-graduate education)	Selected for Inclusion in Study*
51.09 Allied Health Diagnostic, Intervention, and Treatment Professions	
51.0901 Cardiovascular Technology/ Technologist	●
51.0902 Electrocardiograph Technology/ Technician	●
51.0903 Electroneurodiagnostic/ Electroencephalographic Technology/ Technologist	
51.0904 Emergency Medical Technology/ Technician (EMT Paramedic)	●
51.0905 Nuclear Medical Technology/ Technologist	●
51.0906 Perfusion Technology/Perfusionist	
51.0907 Medical Radiologic Technology/ Science – Radiation Therapist	●
51.0908 Respiratory Care Therapy/Therapist	●
51.0909 Surgical Technology/Technologist	●
51.0910 Diagnostic Medical Sonography/ Sonographer and Ultrasound Technician	●
51.0911 Radiologic Technology/Science – Radiographer	●
51.0912 Physician Assistant	
51.0913 Athletic Training/Trainer	
51.0914 Gene/Genetic Therapy	
51.0915 Cardiopulmonary Technology/Technologist	
51.0916 Radiation Protection/Health Physics Technician	
51.10 Clinical/Medical Laboratory Science and Allied Professions	
51.1001 Blood Bank Technology Specialist	
51.1002 Cytotechnology/Cytotechnologist	
51.1003 Hematology Technology/Technician	
51.1004 Clinical/Medical Laboratory Technician	●
51.1005 Clinical Laboratory Science/Medical Technology/Technologist	
51.1006 Ophthalmic Laboratory Technology/ Technician	
51.1007 Histologic Technology/Histotechnologist	
51.1008 Histologic Technician	
51.1009 Phlebotomy/Phlebotomist	
51.1010 Cytogenetics/Genetics/Clinical Genetics Technology/Technologist	
51.1011 Renal/Dialysis Technologist/Technician	
51.15 Mental and Social Health Services and Allied Professions	
51.1501 Substance Abuse/Addiction Counseling	

Classification of Instructional Programs (CIP), 2000 (not including program categories for which all programs require post-graduate education)	Selected for Inclusion in Study*
51.1502 Psychiatric/Mental Health Services Technician	
51.1503 Clinical/Medical Social Work	
51.1504 Community Health Services/Liaison/ Counseling	
51.1505 Marriage and Family Therapy/Counseling	
51.1506 Clinical Pastoral Counseling/Patient Counseling	
51.1507 Psychoanalysis and Psychotherapy	
51.1508 Mental Health Counseling/Counselor	
51.1509 Genetic Counseling/Counselor	
51.18 Ophthalmic and Optometric Support Services and Allied Professions	
51.1801 Opticianry/Ophthalmic Dispensing Optician	
51.1802 Optometric Technician/Assistant	
51.1803 Ophthalmic Technician/Technologist	
51.1804 Orthoptics/Orthoptist	
51.23 Rehabilitation and Therapeutic Professions	
51.2306 Occupational Therapy/Therapist	
51.2307 Orthotist/Prosthetist	
51.2308 Physical Therapy/Therapist	
51.2309 Therapeutic Recreation/Recreational Therapy	
51.2310 Vocational Rehabilitation Counseling/ Counselor	
51.26 Health Aides/Attendants/Orderlies	
51.2601 Health Aide	
51.2602 Home Health Aide/Home Attendant	
51.2603 Medication Aide	
51.31 Dietetics and Clinical Nutrition Services	
51.3101 Dietetics/Dietitian (RD)	
51.3102 Clinical Nutrition/Nutritionist	
51.3103 Dietetic Technician (DTR)	
51.3104 Dietitian Assistant	

*Selected if the education program can be completed at the community college level AND is an occupation common in rural health care delivery.

A-2. Description of Roles and Educational Requirements for Selected Rural-Relevant Allied Health Professions

DENTAL SUPPORT SERVICES AND ALLIED PROFESSIONS

Dental Assistant: Dental Assistants work in dental offices performing a variety of tasks such as setting up appointments and conducting other administrative tasks, sterilizing instruments, creating dental impressions, handing tools to dentists during procedures, holding suction devices, and developing x-rays. Although Dental Assistants rarely perform any procedures, they can obtain privileges to do minor procedures if they are appropriately licensed and registered.

While most Dental Assistants learn their skills through on-the-job training with no requirement for postsecondary training, educational programs (usually lasting one year) are offered by community and junior colleges, trade schools, and technical institutes. Some states require licensure, registration, or certification to perform certain duties. A common credential is the Dental Assisting National Board's (DANB) Certified Dental Assistant (CDA) examination, or one of its components. Prerequisites for the CDA exam include: a high school diploma, a valid CPR certification, and two years of full-time dental assisting work experience or completion of an accredited dental hygiene or dental assisting program. Continuing education is required for recertification.

Dental Hygienist: Dental Hygienists provide preventive dental care to patients including examining patients' teeth and gums for disease and abnormalities, cleaning and polishing teeth, and educating patients about good oral hygiene. Hygienists also commonly take x-rays. Other tasks vary from state to state.

Dental Hygienists most commonly have an associate's degree, although bachelor and masters level programs also exist. Each state requires licensure, though requirements vary from state to state. Most require a degree from an accredited program, the written National Dental Hygiene Board examination, and a state or regional clinical examination.

HEALTH AND MEDICAL ADMINISTRATIVE SERVICES

Health Information/Medical Records Technician: Health Information and Medical Records Technicians organize and manage health information data to ensure accuracy and security. They compile and maintain patients' health information including medical history, examination results, symptoms, diagnostic tests, treatments, and medications. Technicians use electronic health records to maintain and assess patient data.

An associate degree from a community or junior college is typical for this profession. While not necessary for employment, certification is common, such as the American Health Information Management Association's (AHIMA) Registered Health Information Technicians (RHIT) credential. To obtain this credential, technicians must pass a written examination and have graduated from an accredited associates degree program. Other certifications are also an option for those who want specialty credentials.

ALLIED HEALTH AND MEDICAL ASSISTING SERVICES

Medical/Clinical Assistant: Medical/Clinical Assistants conduct both administrative and clinical duties to assist physicians. Depending on education, experience, and physician specialty, Medical/Clinical Assistants' duties vary from scheduling and receiving patients and maintaining medical records to taking patients' histories and vital signs, collecting and processing specimens, and performing diagnostic tests.

Postsecondary education is not required for Medical/Clinical Assistants, many of whom are trained on the job. However, many educational programs exist, including one-year programs for a certificate or diploma, or two-year associate degree programs. The Commission on Accreditation of Allied Health Education Programs (CAAHEP) requires students in accredited programs to complete a practicum with a qualified physician or medical facility. While not necessary, it is generally encouraged for Medical/Clinical Assistants to obtain certification showing that they have achieved specific levels of knowledge. Multiple associations including the American Association of Medical Assistants (AAMA) offer this certification that can be obtained by completing an accredited medical assisting program and passing an exam.

Occupational Therapist Assistant: Occupational Therapist Assistants help provide rehabilitative services to patients with mental, physical, emotional, or developmental problems. Under the supervision of occupational therapists, Occupational Therapy Assistants teach exercises and activities to patients such as stretching exercises, compensation techniques for lost motor skills, and ways to increase independence. They also track patients' progress for the therapist.

An associate degree is usually required to be an Occupational Therapist Assistant. In order to meet the guidelines to practice as an Occupational Therapist Assistant, most states require licensing, registration, or certification. Some states have their own licensing exam, while others recognize the national certifying exam as meeting the requirements for regulation. In order to take the national certifying exam, candidates must have an associate degree from a school accredited by the Accreditation Council for Occupational Therapy Education (ACOTE).

Pharmacy Technician/Assistant: Pharmacy Technicians/Assistants help licensed pharmacists with duties such as receiving prescription requests, counting tablets, and labeling bottles, as well as clerical duties and customer service.

Many Pharmacy Technicians/Assistants learn their skills through on-the-job training. While there is no requirement for postsecondary training, community and junior colleges, trade schools, and hospitals offer educational programs (usually lasting six months to two years) resulting in a certificate, diploma, or associate degree. National certification examinations are available, although most states do not require technicians to be certified. Most states require registration with the state board of pharmacy.

Physical Therapist Assistant: Physical Therapist Assistants work under the supervision of therapists to provide exercise, instruction, and therapy to patients in order to improve patients' mobility, relieve pain, and improve physical disabilities.

In most states, Physical Therapist Assistants must have an associate degree (usually two years) from an accredited program in order to practice. Most states require licensing or certification such as passing a state exam or the National Physical Therapy Exam along with certification in first aid and CPR. Continuing education is usually required for licensure.

Veterinary/Animal Health Technician and Veterinary Assistant: Veterinary/Animal Health Technicians and Veterinary Assistants conduct laboratory and diagnostic medical tests and treat medical conditions in animals under the supervision of a veterinarian. They may also take patient histories and develop x-rays among other duties. Veterinary/Animal Health Technicians and Veterinary Assistants perform a role similar to what nurses do for doctors.

Most Veterinary/Animal Health Technicians and Veterinary Assistants have an associate degree from a community college accredited by the American Veterinary Medical Association (AVMA). All states require a credentialing exam in order to practice. The credentialing process varies from state to state (license, certification, or registration); however, most states recognize the National Veterinary Technician (NVT) exam. Credentials can be transferred between states that use the same exam. Further certification can be obtained through the American Association for Laboratory Animal Science (AALAS) after completion of examinations and work experience. The AALAS offers certification in three principal areas—animal husbandry, facility management, and animal health and welfare.

ALLIED HEALTH DIAGNOSTIC, INTERVENTION, AND TREATMENT PROFESSIONS

Cardiovascular Technologist: Cardiovascular Technologists help physicians diagnose and treat cardiac and blood vessel problems. They may specialize in invasive cardiology, cardiac sonography, or vascular technology. They prepare patients for and monitor their status during cardiac catheterization procedures. They also assess patients' vascular systems and summarize findings to a physician. Vascular technologists use ultrasound equipment to examine heart function.

A two-year junior or community college program leading to an associate degree is the most common educational pathway for Cardiovascular Technologists, although four-year college programs also exist. Though certification is voluntary, it is the professional standard, requiring graduation from an accredited program and an exam. Continuing education is typically required to maintain certification.

Electrocardiograph Technician: Electrocardiograph (EKG) Technicians operate medical equipment that measures heart activity. They explain procedures to patients, obtain medical histories, set up testing, and obtain EKG readings. Cardiologists and other physicians use these measurements when diagnosing and treating cardiac problems.

Most Electrocardiograph Technicians learn their skills through on-the-job training, although some junior colleges and trade schools offer training programs (usually lasting less than six months). One-year certification programs are available for training in specific procedures such as Holter monitoring or stress testing. Though not required, certification is available from many national credentialing organizations.

Emergency Medical Technician (EMT)/Paramedic: EMTs and Paramedics provide medical services to patients suffering from any accidents or medical conditions needing immediate assistance. They also transport these patients to medical facilities for more extensive care. EMTs and Paramedics are first-responders during emergencies.

There are five levels of training, according to the National Registry of Emergency Medical Technicians (NREMT), for those interested in emergency response: First Responder, EMT-Basic, EMT-Intermediate 1985, EMT-Intermediate 1999, and Paramedic. In order to achieve EMT-Basic status, one must graduate from an approved program and pass a written and practical exam by the NREMT or a state agency. EMT-Intermediate 1985 and EMT-Intermediate 1999 require between 30 and 350 hours of additional training. Paramedics are required to have the highest level of training and often receive an associate's degree from a community or technical school. Furthermore, they are required to take the NREMT examination to be certified as a Paramedic. Most states require that EMTs and Paramedics renew their licenses every two to three years, as well as complete continuing education courses on a regular basis in order to keep skills fresh and up to date.

Nuclear Medical Technologist: Nuclear Medical Technologists create diagnostic images by detecting and mapping radioactive drugs in a patient's body. They prepare and administer the radioactive drugs (radiopharmaceuticals) to patients, position the patient, then use cameras to create images of the distribution of the radioactive drug in the body. The images are given to a physician to interpret. Technologists keep detailed records of the patient's treatment.

One to four years of postsecondary training is required for Nuclear Medical Technologists. Hospitals offer certificate programs for health professionals with preexisting training, community colleges offer associate degrees, and four-year institutions offer bachelor's degrees. Certification is not required by law in order to practice, but most employers encourage certification either from the American Registry of Radiologic Technologists (ARRT) or the Nuclear Medicine Technology Certification Board (NMTCB). Continuing education is required to maintain certification. Some states also require licensure.

Medical Radiologic Technology/Science—Radiation Therapist: Radiation Therapists are part of an oncology team who use radiation therapy to treat cancer by shrinking and eliminating cancer cells. Radiation Therapists help develop a treatment plan by using imaging technology to identify the patient's tumor location and record how equipment should be set up to provide treatment. They also explain the treatment plan to the patient and answer questions. Radiation Therapists administer the radiation treatment to patients by using linear accelerators, which project high-energy x-rays at specific cancer cells. They position the patient and the equipment, administer the radiation, and monitor the patient's condition from a separate room. They also maintain detailed records about the treatment, especially dosing.

Radiation Therapists must have an associate or bachelor's degree either in radiation therapy or in radiography with a one-year certificate program. Most states require licensure to practice. Licensing requirements are often the same as certification requirements, which include completion of an accredited radiation therapy program and passage of the American Registry of Radiologic Technologists (ARRT) exam. Continuing education is required to maintain certification.

Respiratory Care Therapist: Under the direction of a physician, Respiratory Care Therapists (also referred to as Respiratory Therapists) diagnose and provide treatment for patients with breathing or other cardiopulmonary problems. They help develop treatment plans and conduct diagnostic tests and physical exams. They administer treatment, assess patient conditions, and ensure equipment is properly functioning. Respiratory Care Therapists also conduct chest physiotherapy and provide education and counseling for patients.

In order to practice, Respiratory Therapists are required to have either a two-year associate degree or four-year bachelor's degree and must be licensed in all but two states. Licensure requirements are usually met with the Certified Respiratory Therapist (CRT) credential from the National Board for Respiratory Care (NBRC), which can be obtained by graduating from an accredited program and passing an exam. Advanced credentials can also be obtained from the NBRC for therapists who graduated from advanced programs and pass additional examinations.

Surgical Technologist: Surgical Technologists are members of operating room teams who assist in surgical operations. Their duties include setting up or assembling surgical equipment and instruments in operating rooms and ensuring everything is in working order. They prepare patients for surgery, transport them to and from the operating room, and check vital signs and medical records. Surgical technologists assist the surgical team by helping them put on gowns and gloves, hand them instruments during surgery, and help manage specimens for laboratory analysis.

Postsecondary training is required for surgical technologists. Community and junior colleges, vocational schools, universities, and hospitals offer certificates, diplomas, or associate degrees through programs typically lasting 9 to 24 months. While not necessary for employment, Surgical Technologists may obtain certification by graduating from an accredited program and passing a national exam. The National Center for Competency Testing (NCCT) also offers certification for Surgical Technologists who have completed an accredited training program or a two-year hospital on-the-job training program, or accumulated seven years of work experience. Continuing education or reexamination is required to maintain certification.

Diagnostic Medical Sonographer/Ultrasound Technician: Diagnostic Medical Sonographers operate equipment that uses sound waves to generate images that a physician interprets and uses for diagnosis. They explain procedures, appropriately position the patient, and perform the exam. Diagnostic Medical Sonographers review the images and produce preliminary findings for physicians. They also maintain patient records and equipment. Diagnostic Medical Sonographers often specialize in specific areas of the body, such as obstetric and gynecologic sonography, which is used to view a woman's fetus during prenatal visits.

Diagnostic Medical Sonographers train in hospitals, vocational schools, colleges, and universities. An associate degree, bachelor's degree, or vocational certificate is needed for employment. Most Diagnostic Medical Sonographers complete an associate's degree. Currently, no state requires licensure in diagnostic medical sonography. However, organizations such as the American Registry for Diagnostic Medical Sonography (ARDMS) and the American Registry of Radiologic Technologists (ARRT) offer certification after the passage of a national examination. Continuing education is typically required to maintain certification.

Radiologic Technology/Science—Radiographer: Radiographers conduct diagnostic imaging procedures, most commonly producing x-ray films. They prepare patients for the procedure and position and adjust radiographic equipment to create the appropriate imaging. Radiographers also maintain patient records and equipment. Some specialize in other types of imaging such as computed tomography, magnetic resonance imaging, and mammography.

The majority of Radiographers acquire an associate degree, although certificate programs are also common. Programs leading to a bachelor's degree are also available. Most states require licensure to practice radiologic technology; however, requirements vary. The American Registry of Radiologic Technologists (ARRT) offers certification that requires graduating from an accredited program and passing a national examination. Certification often meets state licensure requirements. Continuing education is required to maintain certification.

CLINICAL/MEDICAL LABORATORY SCIENCE AND ALLIED PROFESSIONS

Clinical/Medical Laboratory Technician: Clinical/Medical Laboratory Technicians perform testing on body fluids and cells that lead to diagnosis and treatment of disease. Under the supervision of a laboratory technologist, they prepare, process, and analyze specimens (e.g., identifying microorganisms and abnormal cells, matching blood for transfusions,) and maintain and operate testing equipment.

Clinical/Medical Laboratory Technicians most commonly have an associate degree from a community or junior college, or a certificate from a hospital program. In addition, some technicians are trained on the job. Certification is available from the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Licensure requirements vary by state.

REFERENCES

The information for this appendix was drawn from the following sources:

O*NET OnLine. Summary report for: 29-2032.00--diagnostic medical sonographers. Available at: http://www.onetonline.org/link/summary/29-2032.00. Accessed August 4, 2011.

U.S. Department of Labor, Bureau of Labor Statistics. Occupational outlook handbook, 2010-11 edition. Available at: http://www.bls.gov/oco/. Accessed August 4, 2011.

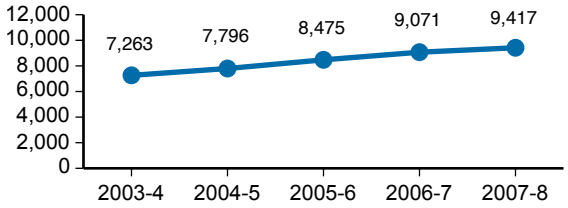
APPENDIX B. COMMUNITY COLLEGE EDUCATION PROGRAMS IN ALLIED HEALTH CAREERS: DESCRIPTION OF EDUCATION PROGRAMS BY PROFESSION TYPE AND THEIR PROXIMITY TO RURAL POPULATIONS

DENTAL ASSISTANT

Education Programs in Community Colleges

Community College Program Locations

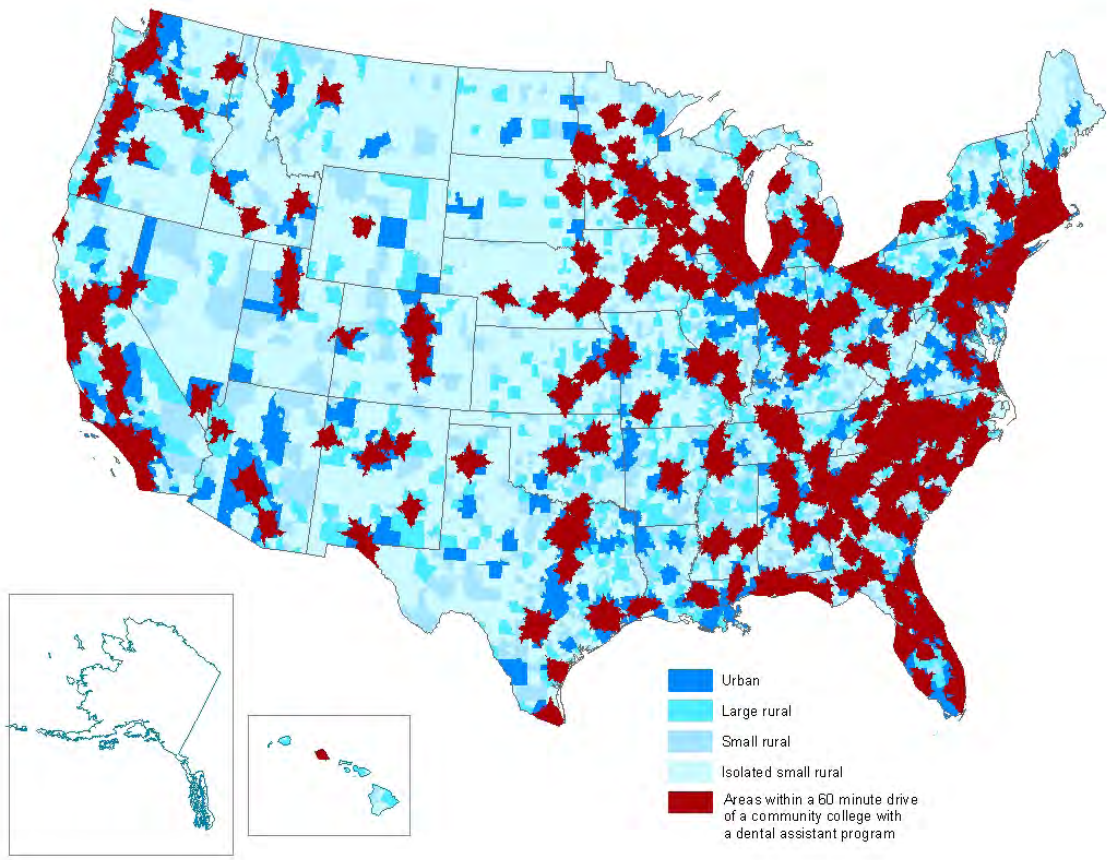
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	345	(100.0%)
Region		
West	114	(33.0%)
Midwest	89	(25.8%)
South	113	(32.8%)
Northeast	29	(8.4%)

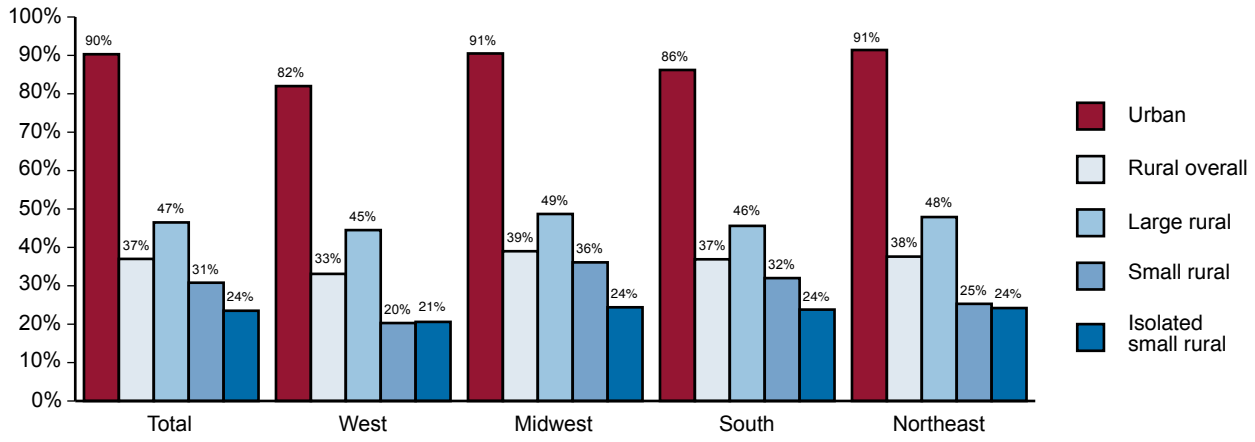
Areas Within a 60-Minute Drive of Community Colleges with Dental Assistant Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Dental Assistant (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Dental Assistant Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Dental Assistant Program

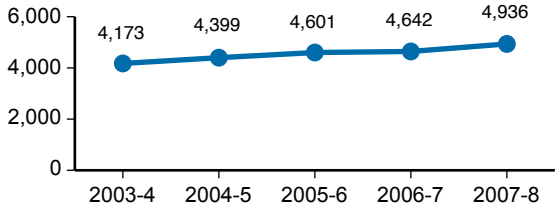
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	245,607,781 (80.2%)	224,187,742 (90.3%)	21,420,039 (37.0%)	13,524,393 (46.5%)	4,657,405 (30.8%)	3,238,241 (23.5%)
Region						
West	61,620,474 (86.5%)	58,432,953 (82.0%)	3,187,521 (33.1%)	2,256,515 (44.5%)	494,173 (20.3%)	436,833 (20.6%)
Midwest	52,337,771 (77.5%)	45,671,744 (90.5%)	6,666,027 (39.0%)	3,957,142 (48.7%)	1,617,265 (36.1%)	1,091,620 (24.4%)
South	84,216,677 (75.2%)	75,037,124 (86.2%)	9,179,553 (36.9%)	5,617,212 (45.6%)	2,257,711 (32.0%)	1,304,630 (23.8%)
Northeast	47,432,859 (85.3%)	45,045,921 (91.4%)	2,386,938 (37.6%)	1,693,524 (47.9%)	288,256 (25.3%)	405,158 (24.2%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	180,454,107 (58.9%)	175,781,173 (70.8%)	4,672,934 (8.1%)	3,651,495 (12.6%)	632,822 (4.2%)	388,617 (2.8%)
Region						
West	53,145,318 (74.6%)	51,824,300 (72.8%)	1,321,018 (13.7%)	1,138,330 (22.4%)	81,689 (3.4%)	100,999 (4.8%)
Midwest	36,079,331 (53.4%)	34,715,271 (68.8%)	1,364,060 (8.0%)	1,038,762 (12.8%)	225,972 (5.0%)	99,326 (2.2%)
South	56,898,184 (50.8%)	55,260,185 (63.5%)	1,637,999 (6.6%	1,183,253 (9.6%)	306,954 (4.4%)	147,792 (2.7%)
Northeast	34,331,274 (61.7%)	33,981,417 (68.9%)	349,857 (5.5%)	291,150 (8.2%)	18,207 (1.6%)	40,500 (2.4%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,069,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.4%)	1,137,901 (2.0%)	1,675,219 (3.0%)

DENTAL HYGIENIST

Education Programs in Community Colleges

Community College Program Locations

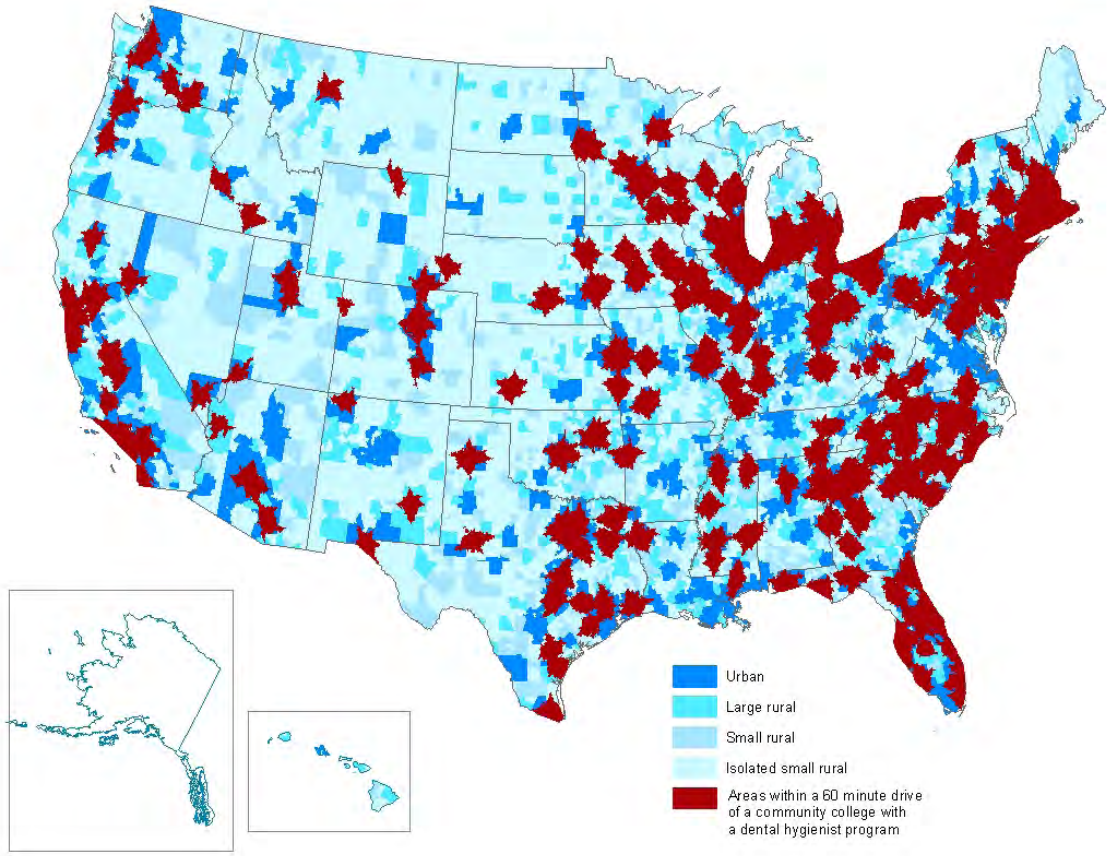
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	244	(100.0%)
Region		
West	53	(21.7%)
Midwest	65	(26.6%)
South	92	(37.7%)
Northeast	34	(13.9%)

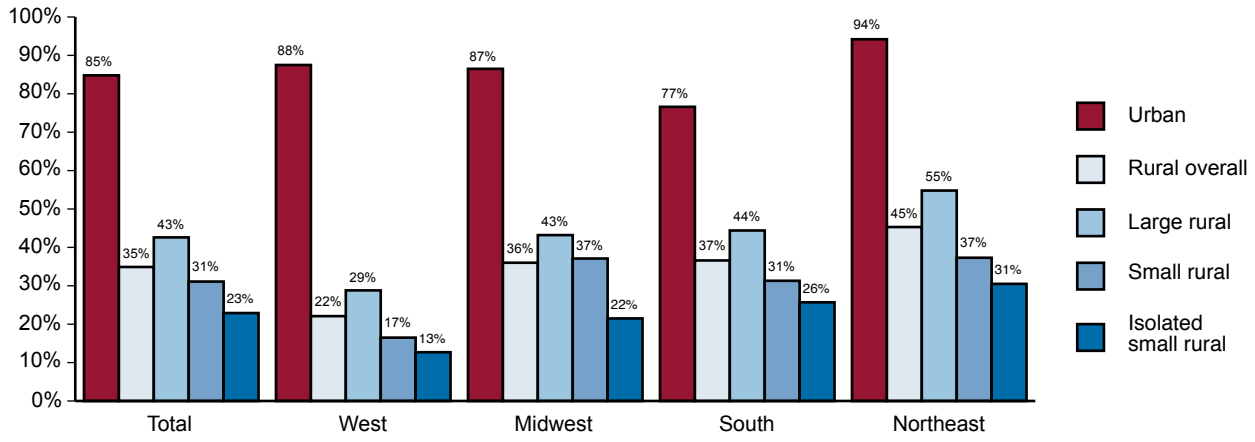
Areas Within a 60-Minute Drive of Community Colleges with Dental Hygienist Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Dental Hygienist (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Dental Hygienist Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Dental Hygienist Program

	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	230,838,385 (75.4%)	210,599,166 (84.8%)	20,239,219 (34.9%)	12,387,725 (42.6%)	4,698,219 (31.1%)	3,153,275 (22.9%)
Region						
West	55,952,722 (78.6%)	53,819,956 (87.5%)	2,132,766 (22.1%)	1,460,451 (28.8%)	402,874 (16.5%)	269,441 (12.7%)
Midwest	49,818,423 (73.7%)	43,675,840 (86.5%)	6,142,583 (36.0%)	3,516,039 (43.2%)	1,663,914 (37.1%)	962,630 (21.5%)
South	75,785,084 (67.7%)	66,693,722 (76.6%)	9,091,362 (36.6%)	5,474,965 (44.4%)	2,206,846 (31.3%)	1,409,551 (25.7%)
Northeast	49,282,156 (88.6%)	46,409,648 (94.2%)	2,872,508 (45.3%)	1,936,270 (54.8%)	424,585 (37.3%)	511,653 (30.5%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	162,677,554 (53.1%)	158,674,836 (63.9%)	4,002,718 (6.9%)	2,999,935 (10.3%)	636,644 (4.2%)	366,139 (2.7%)
Region						
West	44,169,165 (62.0%)	43,599,494 (70.8%)	569,671 (5.9%)	486,157 (9.6%)	29,867 (1.2%)	53,647 (2.5%)
Midwest	36,711,967 (54.3%)	35,567,416 (70.5%)	1,144,551 (6.7%)	846,982 (10.4%)	235,060 (5.2%)	62,509 (1.4%)
South	45,842,340 (41.0%)	44,031,968 (50.6%)	1,810,372 (7.3%)	1,283,084 (10.4%)	326,098 (4.6%)	201,190 (3.7%)
Northeast	35,954,082 (64.6%)	35,475,958 (72.0%)	478,124 (7.5%)	383,712 (10.9%)	45,619 (4.0%)	48,793 (2.9%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
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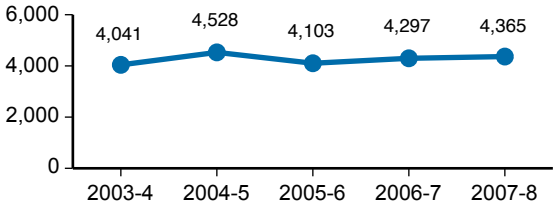
HEALTH INFORMATION/MEDICAL RECORDS TECHNICIAN

Education Programs in Community Colleges

Community College Program Locations

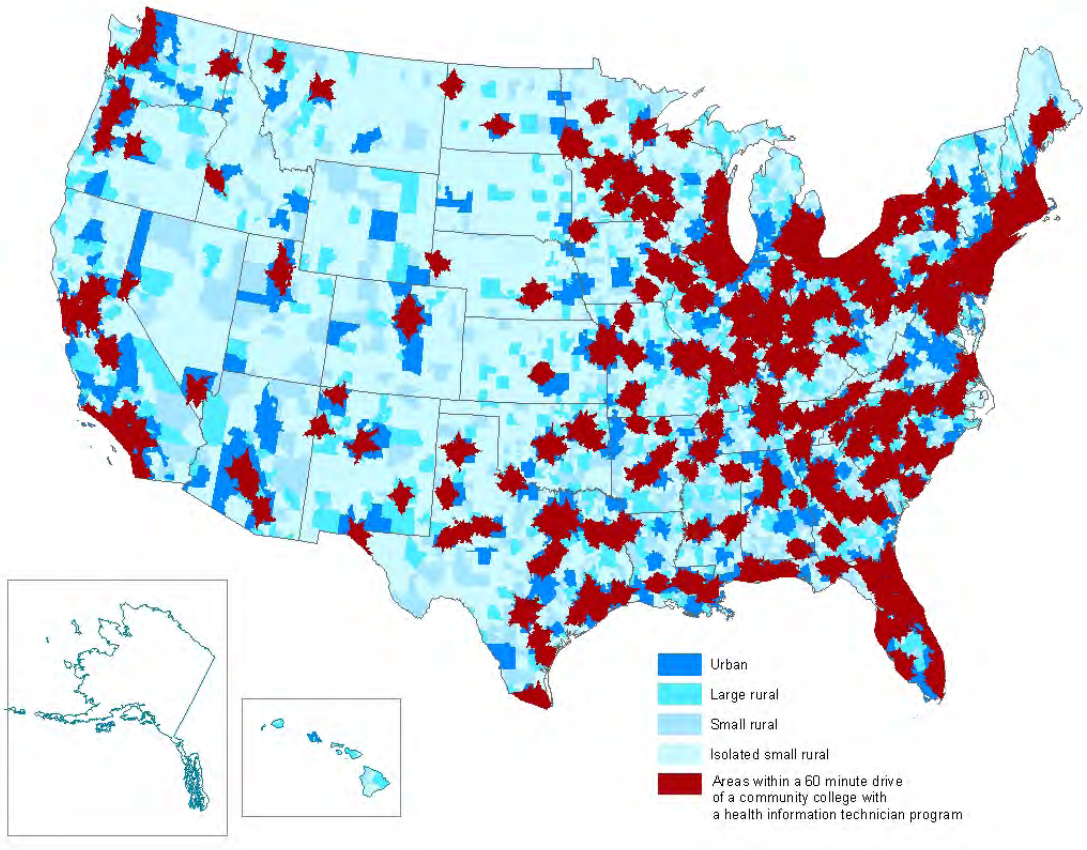
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	346	(100.0%)
Region		
West	67	(19.4%)
Midwest	102	(29.5%)
South	139	(40.2%)
Northeast	38	(11.0%)

Areas Within a 60-Minute Drive of Community Colleges with Health Information/Medical Records Technician Education Programs, in Relation to Rural and Urban Areas of the United States



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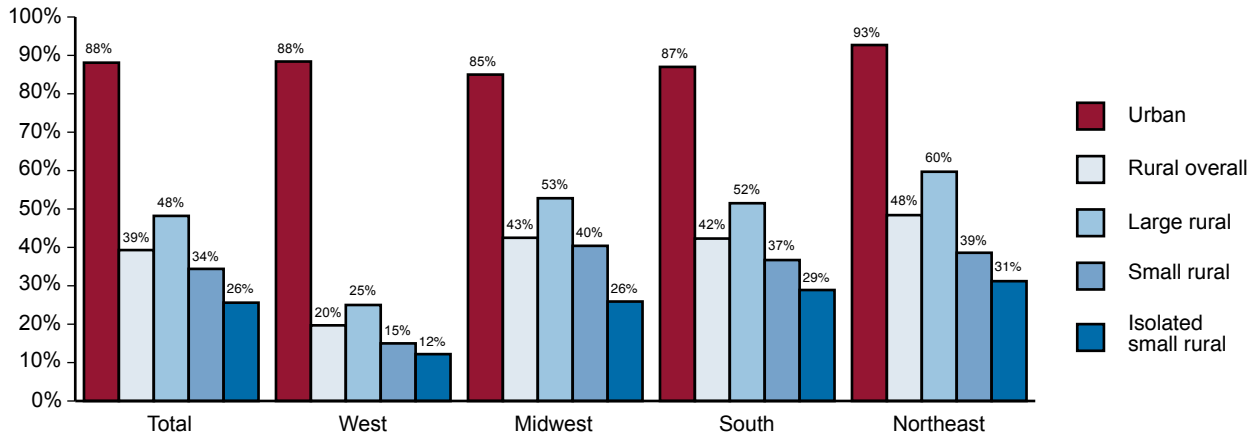
Health Information/Medical Records Technician (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Health Information/Medical Records Technician Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Health Information/Medical Records Technician Program

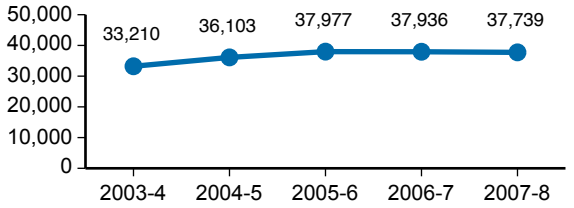
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	241,524,837 (78.9%)	218,783,112 (88.1%)	22,741,725 (39.3%)	14,012,534 (48.2%)	5,201,732 (34.4%)	3,527,459 (25.6%)
Region						
West	56,305,202 (79.1%)	54,411,082 (88.4%)	1,894,120 (19.7%)	1,270,947 (25.0%)	364,747 (15.0%)	258,426 (12.2%)
Midwest	50,161,706 (74.2%)	42,899,367 (85.0%)	7,262,339 (42.5%)	4,290,952 (52.8%)	1,812,042 (40.4%)	1,159,345 (25.9%)
South	86,288,261 (77.1%)	75,774,033 (87.0%)	10,514,228 (42.3%)	6,341,615 (51.5%)	2,585,819 (36.7%)	1,586,794 (28.9%)
Northeast	48,769,668 (87.7%)	45,698,630 (92.7%)	3,071,038 (48.4%)	2,109,020 (59.7%)	439,124 (38.6%)	522,894 (31.2%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	178,772,557 (58.4%)	173,957,045 (70.0%)	4,815,512 (8.3%)	3,689,979 (12.7%)	745,867 (4.9%)	379,666 (2.8%)
Region						
West	45,982,066 (64.6%)	45,544,704 (74.0%)	437,362 (4.5%)	341,993 (6.7%)	53,166 (2.2%)	42,203 (2.0%)
Midwest	37,324,590 (55.2%)	35,907,273 (71.1%)	1,417,317 (8.3%)	1,017,344 (12.5%)	272,580 (6.1%)	127,393 (2.8%)
South	59,781,709 (53.4%)	57,521,551 (66.1%)	2,260,158 (9.1%)	1,756,074 (14.3%)	345,012 (4.9%)	159,072 (2.9%)
Northeast	35,684,192 (64.1%)	34,983,517 (71.0%)	700,675 (11.0%)	574,568 (16.3%)	75,109 (6.6%)	50,998 (3.0%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

MEDICAL/CLINICAL ASSISTANT

Education Programs in Community Colleges

Community College Program Locations

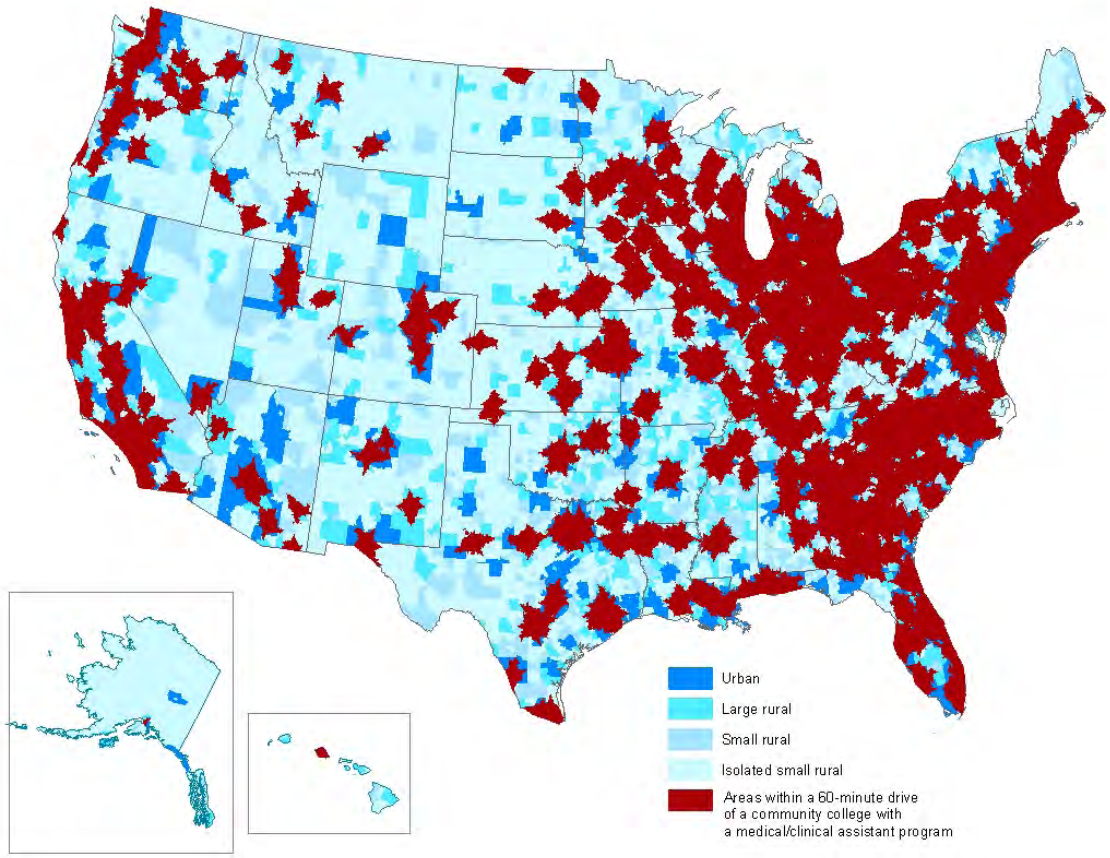
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	825	(100.0%)
Region		
West	196	(23.8%)
Midwest	233	(28.2%)
South	297	(36.0%)
Northeast	99	(12.0%)

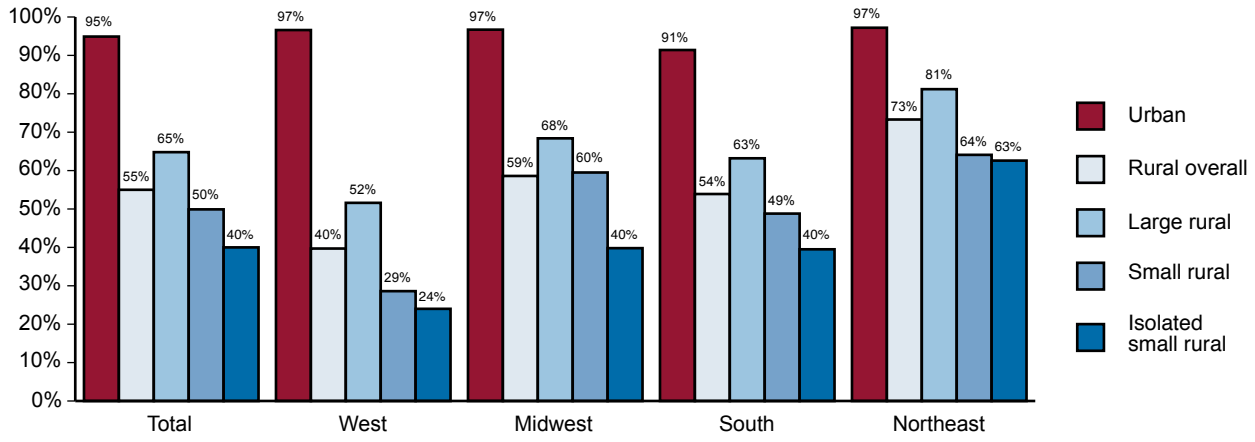
Areas Within a 60-Minute Drive of Community Colleges with Medical/Clinical Assistant Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Medical/Clinical Assistant (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Medical/Clinical Assistant Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Medical/Clinical Assistant Program

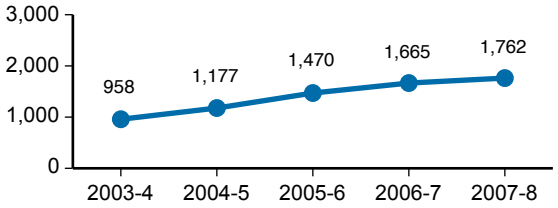
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	267,625,466 (87.4%)	235,755,671 (94.9%)	31,869,795 (55.0%)	18,833,548 (64.8%)	7,533,881 (49.9%)	5,502,366 (40.0%)
Region						
West	63,255,358 (88.8%)	59,430,255 (96.6%)	3,825,103 (39.7%)	2,619,190 (51.6%)	696,362 (28.6%)	509,551 (24.0%)
Midwest	58,799,290 (87.0%)	48,791,941 (96.7%)	10,007,349 (58.6%)	5,559,373 (68.4%)	2,669,047 (59.5%)	1,778,929 (39.8%)
South	93,002,524 (83.1%)	79,613,772 (91.4%)	13,388,752 (53.9%)	7,785,227 (63.2%)	3,439,019 (48.8%)	2,164,506 (39.5%)
Northeast	52,568,294 (94.5%)	47,919,703 (97.2%)	4,648,591 (73.3%)	2,869,758 (81.2%)	729,453 (64.1%)	1,049,380 (62.6%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	214,717,941 (70.1%)	204,429,966 (82.3%)	10,287,975 (17.8%)	7,643,532 (26.3%)	1,726,235 (11.4%)	918,208 (6.7%)
Region						
West	55,956,896 (78.6%)	54,258,886 (88.2%)	1,698,010 (17.6%)	1,409,127 (27.8%)	162,182 (6.7%)	126,701 (6.0%)
Midwest	45,714,180 (67.7%)	42,616,326 (84.4%)	3,097,854 (18.1%)	2,218,518 (27.3%)	675,763 (15.1%)	203,573 (4.6%)
South	70,630,206 (63.1%)	66,368,091 (76.2%)	4,262,115 (17.1%)	3,105,474 (25.2%)	698,958 (9.9%)	457,683 (8.3%)
Northeast	42,416,659 (76.2%)	41,186,663 (83.6%)	1,229,996 (19.4%)	910,413 (25.8%)	189,332 (16.6%)	130,251 (7.8%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

OCCUPATIONAL THERAPIST ASSISTANT

Education Programs in Community Colleges

Community College Program Locations

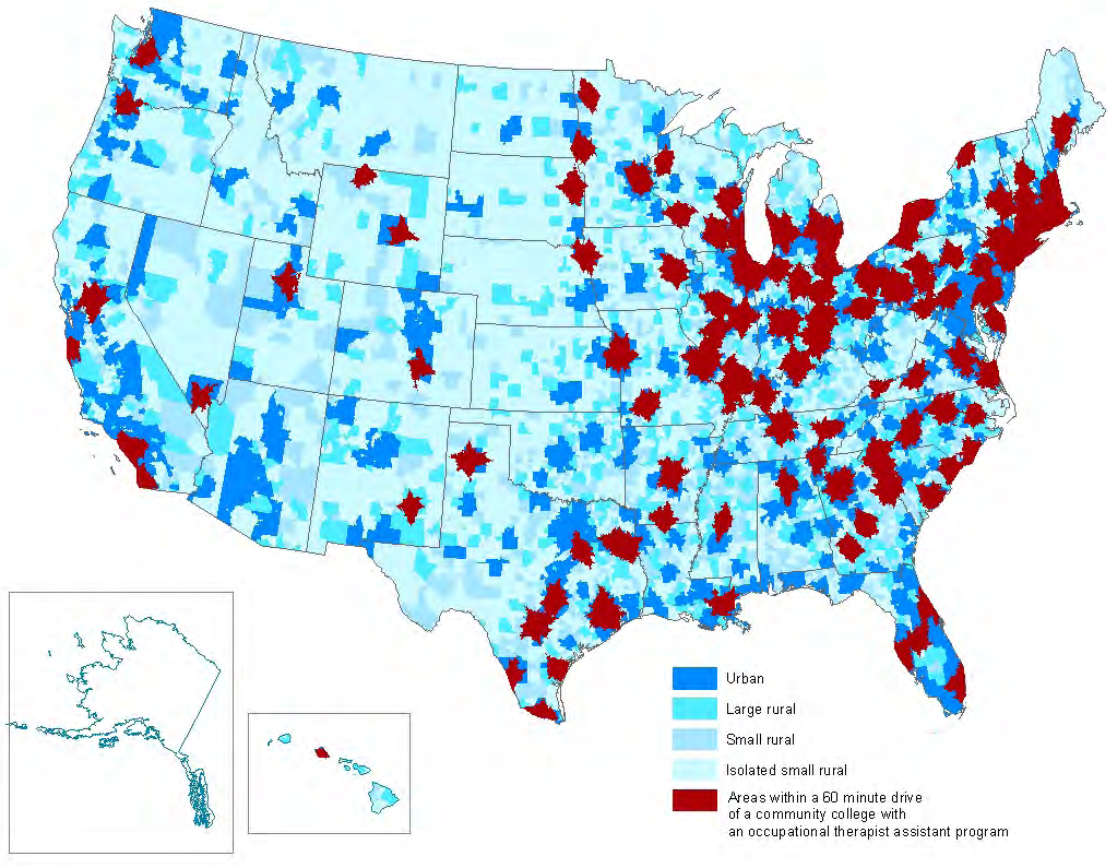
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	126	(100.0%)
Region		
West	13	(10.3%)
Midwest	41	(32.5%)
South	45	(35.7%)
Northeast	27	(21.4%)

Areas Within a 60-Minute Drive of Community Colleges with Occupational Therapist Assistant Education Programs, in Relation to Rural and Urban Areas of the United States



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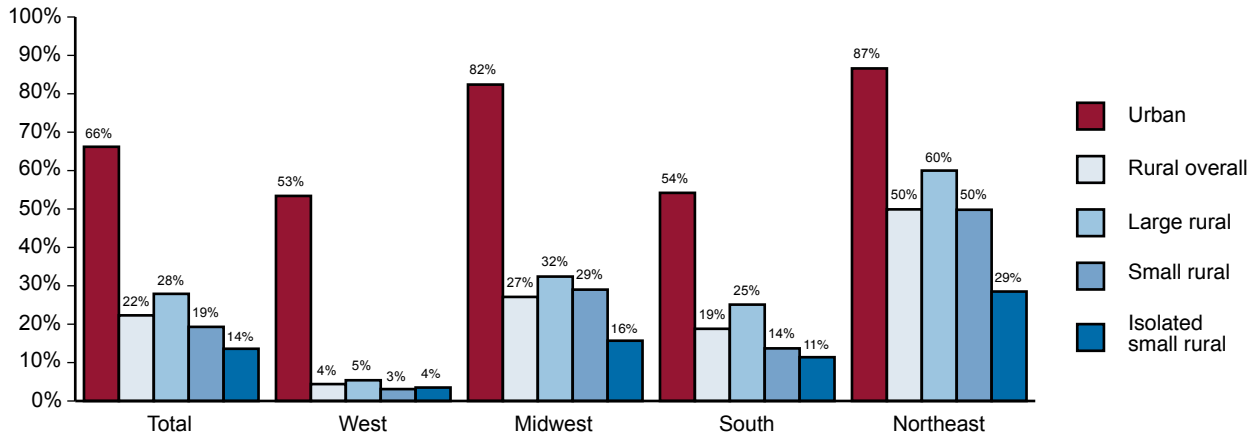
Occupational Therapist Assistant (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Occupational Therapist Assistant Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Occupational Therapist Assistant Program

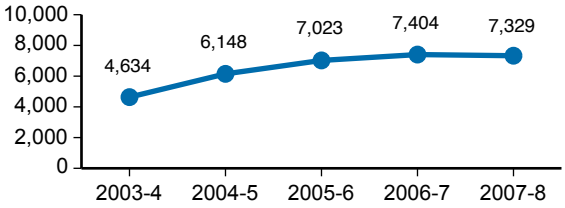
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	177,209,406 (57.9%)	164,307,922 (66.2%)	12,901,484 (22.3%)	8,133,132 (27.9%)	2,912,083 (19.3%)	1,876,269 (13.6%)
Region						
West	33,275,002 (46.7%)	32,849,948 (53.4%)	425,054 (4.4%)	273,532 (5.4%)	76,714 (3.1%)	74,808 (3.5%)
Midwest	46,208,896 (68.4%)	41,573,314 (82.4%)	4,635,582 (27.1%)	2,633,943 (32.4%)	1,301,236 (29.0%)	700,403 (15.7%)
South	51,856,911 (46.3%)	47,179,668 (54.2%)	4,677,243 (18.8%)	3,086,781 (25.1%)	967,430 (13.7%)	623,032 (11.4%)
Northeast	45,868,597 (82.5%)	42,704,992 (86.6%)	3,163,605 (49.9%)	2,118,876 (60.0%)	566,703 (49.8%)	478,026 (28.5%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	100,043,935 (32.7%)	97,479,599 (39.2%)	2,564,336 (4.4%)	1,877,234 (6.5%)	497,268 (3.3%)	189,834 (1.4%)
Region						
West	17,323,345 (24.3%)	17,173,257 (27.9%)	150,088 (1.6%)	127,701 (2.5%)	12,953 (0.5%)	9,434 (0.4%)
Midwest	28,065,927 (41.5%)	27,368,815 (54.2%)	697,112 (4.1%)	462,410 (5.7%)	179,344 (4.0%)	55,358 (1.2%)
South	26,692,662 (23.8%)	25,741,800 (29.6%)	950,862 (3.8%)	730,573 (5.9%)	145,002 (2.1%)	75,287 (1.4%)
Northeast	27,962,001 (50.3%)	27,195,727 (55.2%)	766,274 (12.1%)	556,550 (15.8%)	159,969 (14.1%)	49,755 (3.0%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

PHARMACY TECHNICIAN/ASSISTANT

Education Programs in Community Colleges

Community College Program Locations

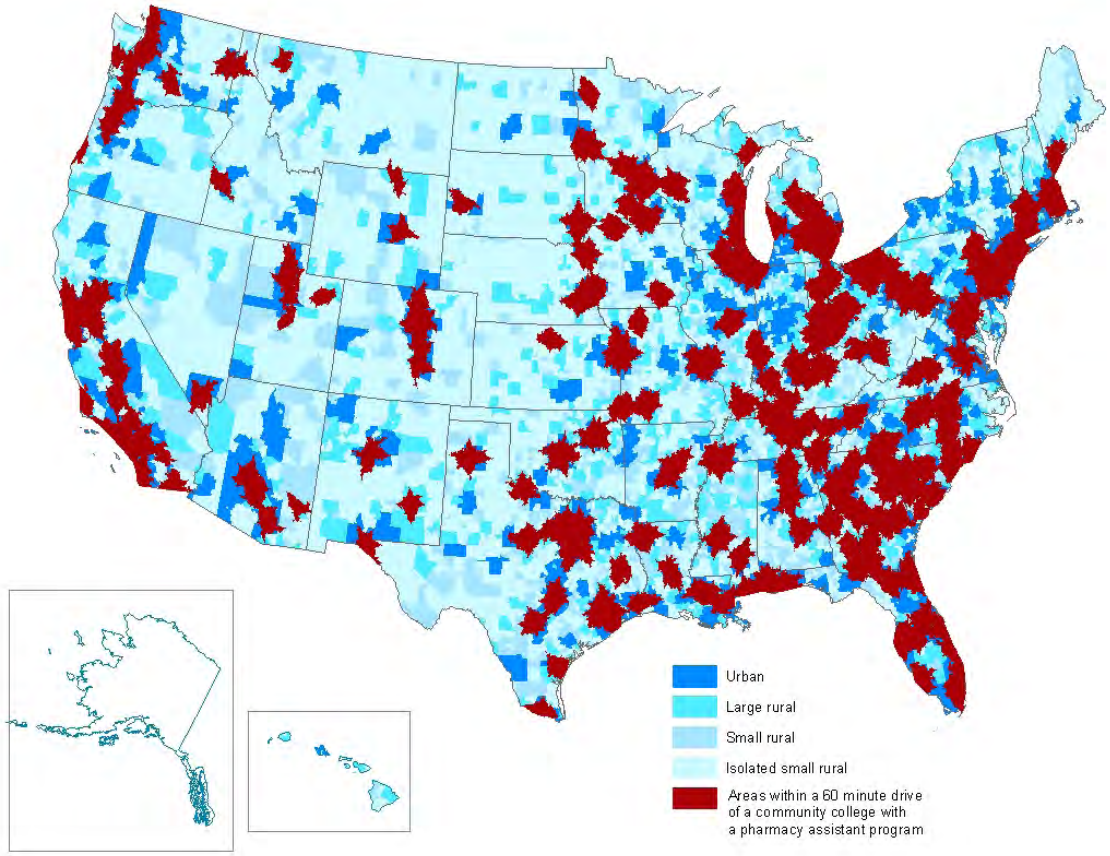
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	363	(100.0%)
Region		
West	106	(29.2%)
Midwest	83	(22.9%)
South	151	(41.6%)
Northeast	23	(6.3%)

Areas Within a 60-Minute Drive of Community Colleges with Pharmacy Technician/Assistant Education Programs, in Relation to Rural and Urban Areas of the United States



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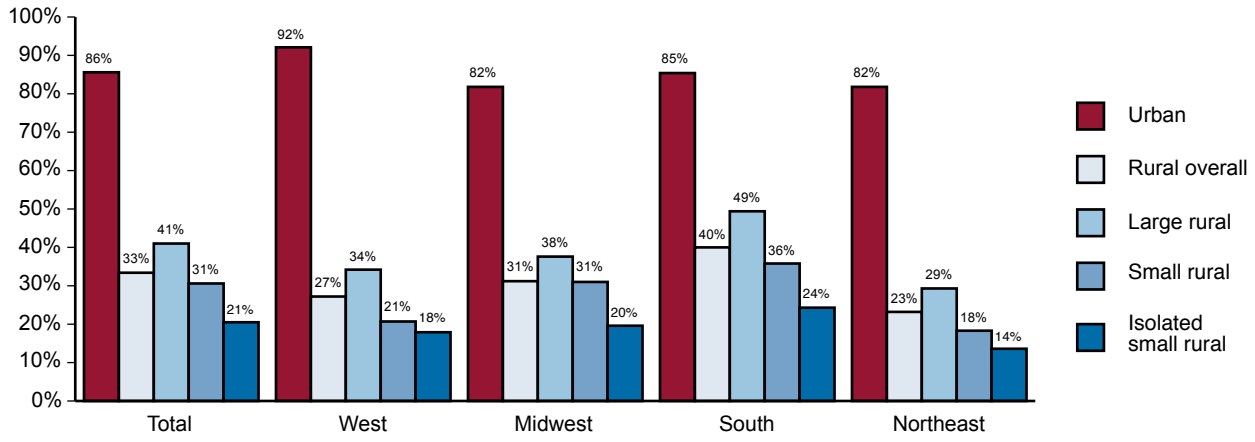
Pharmacy Technician/Assistant (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Pharmacy Technician/Assistant Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Pharmacy Technician/Assistant Program

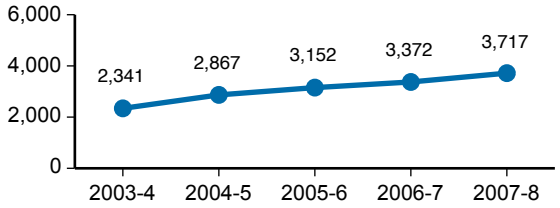
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	231,960,937 (75.7%)	212,594,440 (85.6%)	19,366,497 (33.4%)	11,922,759 (41.0%)	4,629,844 (30.6%)	2,813,894 (20.5%)
Region						
West	59,291,243 (83.2%)	56,669,135 (92.1%)	2,622,108 (27.2%)	1,737,453 (34.2%)	505,115 (20.7%)	379,540 (17.9%)
Midwest	46,612,480 (69.0%)	51,288,306 (81.8%)	5,324,174 (31.2%)	3,059,169 (37.6%)	1,389,723 (31.0%)	875,282 (19.6%)
South	84,290,309 (75.3%)	74,340,829 (85.4%)	9,949,480 (40.0%)	6,091,997 (49.4%)	2,527,028 (35.8%)	1,330,455 (24.3%)
Northeast	41,766,905 (75.1%)	40,296,170 (81.8%)	1,470,735 (23.2%)	1,034,140 (29.3%)	207,978 (18.3%)	228,617 (13.6%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	173,588,553 (56.7%)	169,079,502 (68.1%)	4,509,051 (7.8%)	3,478,761 (12.0%)	713,061 (4.7%)	317,229 (2.3%)
Region						
West	51,687,549 (72.6%)	50,579,818 (82.2%)	1,107,731 (11.5%)	905,109 (17.8%)	110,301 (4.5%)	92,321 (4.4%)
Midwest	34,133,026 (50.5%)	33,033,011 (65.4%)	1,100,015 (6.4%)	818,030 (10.1%)	214,664 (4.8%)	67,321 (1.5%)
South	59,047,815 (52.8%)	56,899,323 (65.3%)	2,148,492 (8.6%)	1,657,632 (13.5%)	352,383 (5.0%)	138,477 (2.5%)
Northeast	28,720,163 (51.6%)	28,567,350 (58.0%)	152,813 (2.4%)	97,990 (2.8%)	35,713 (3.1%)	19,110 (1.1%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

PHYSICAL THERAPIST ASSISTANT

Education Programs in Community Colleges

Community College Program Locations

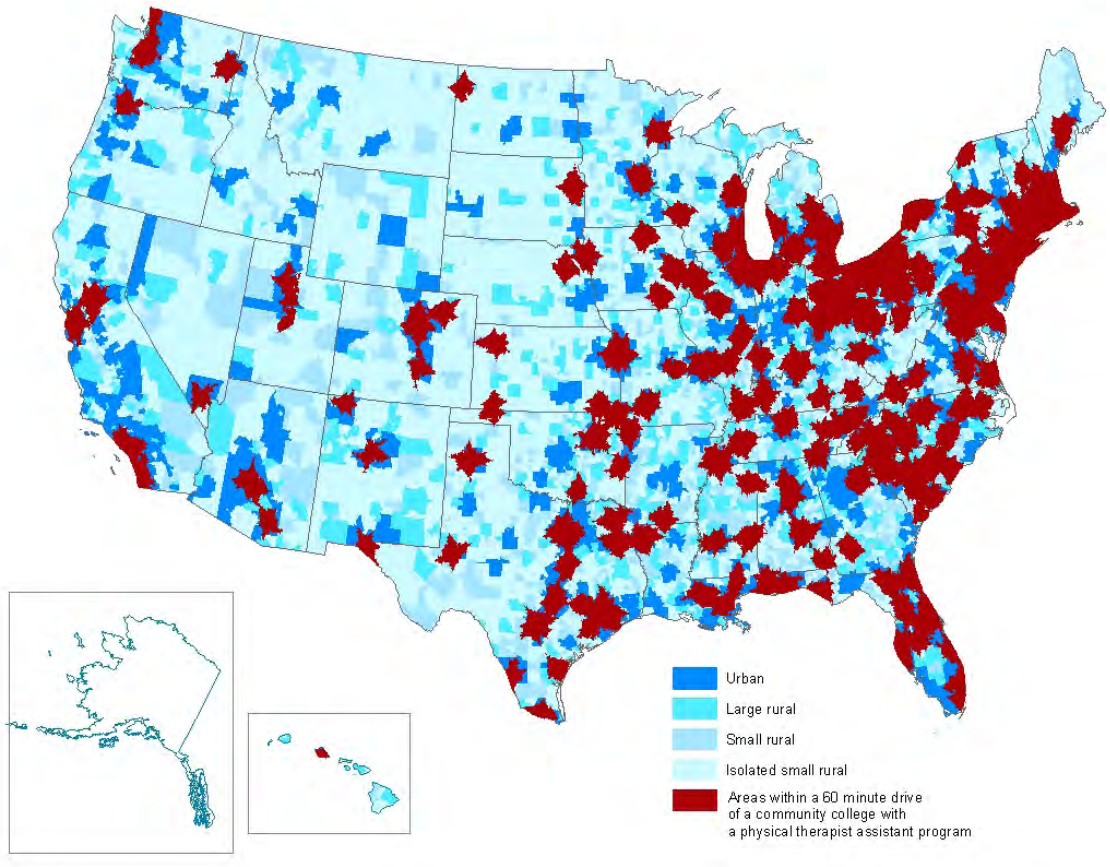
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	228	(100.0%)
Region		
West	26	(11.4%)
Midwest	58	(25.4%)
South	99	(43.4%)
Northeast	45	(19.7%)

Areas Within a 60-Minute Drive of Community Colleges with Physical Therapist Assistant Education Programs, in Relation to Rural and Urban Areas of the United States



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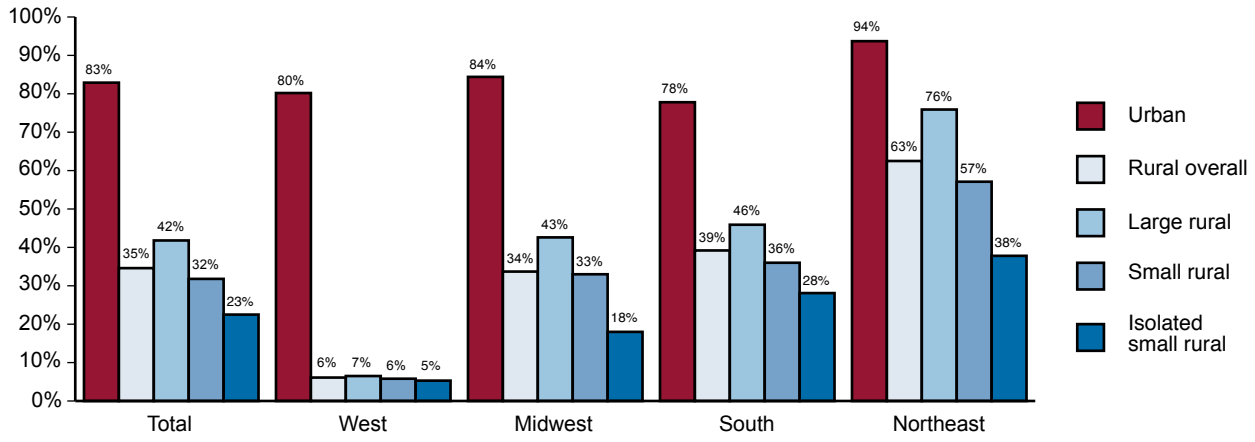
Physical Therapist Assistant (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Physical Therapist Assistant Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Physical Therapist Assistant Program

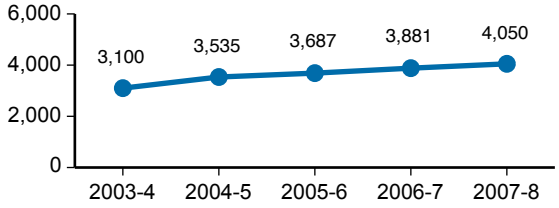
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	225,892,513 (73.8%)	205,848,430 (82.9%)	20,044,083 (34.6%)	12,137,252 (41.8%)	4,812,022 (31.8%)	3,094,809 (22.5%)
Region						
West	49,941,820 (70.1%)	49,355,864 (80.2%)	585,956 (6.1%)	332,145 (6.5%)	140,828 (5.8%)	112,983 (5.3%)
Midwest	48,347,631 (71.6%)	42,595,231 (84.4%)	5,752,400 (33.7%)	3,465,412 (42.6%)	1,481,231 (33.0%)	805,757 (18.0%)
South	77,449,436 (69.2%)	67,711,008 (77.8%)	9,738,428 (39.2%)	5,656,707 (45.9%)	2,539,662 (36.0%)	1,542,059 (28.1%)
Northeast	50,153,626 (90.2%)	46,186,327 (93.7%)	3,967,299 (62.5%)	2,682,988 (75.9%)	650,301 (57.1%)	634,010 (37.8%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	150,685,574 (49.2%)	146,077,874 (58.8%)	4,607,700 (8.0%)	3,325,494 (11.4%)	870,882 (5.8%)	411,324 (3.0%)
Region						
West	33,707,335 (47.3%)	33,569,393 (54.6%)	137,942 (1.4%)	91,409 (1.8%)	31,360 (1.3%)	15,173 (0.7%)
Midwest	30,935,446 (45.8%)	29,655,108 (58.8%)	1,280,338 (7.5%)	982,427 (12.1%)	236,767 (5.3%)	61,144 (1.4%)
South	48,865,909 (43.7%)	46,746,962 (53.7%)	2,118,947 (8.5%)	1,489,121 (12.1%)	377,179 (5.3%)	252,647 (4.6%)
Northeast	37,176,884 (66.8%)	36,106,411 (73.3%)	1,070,473 (16.9%)	762,537 (21.6%)	225,576 (19.8%)	82,360 (4.9%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

VETERINARY/ANIMAL HEALTH TECHNICIAN AND VETERINARY ASSISTANT

Education Programs in Community Colleges

Community College Program Locations

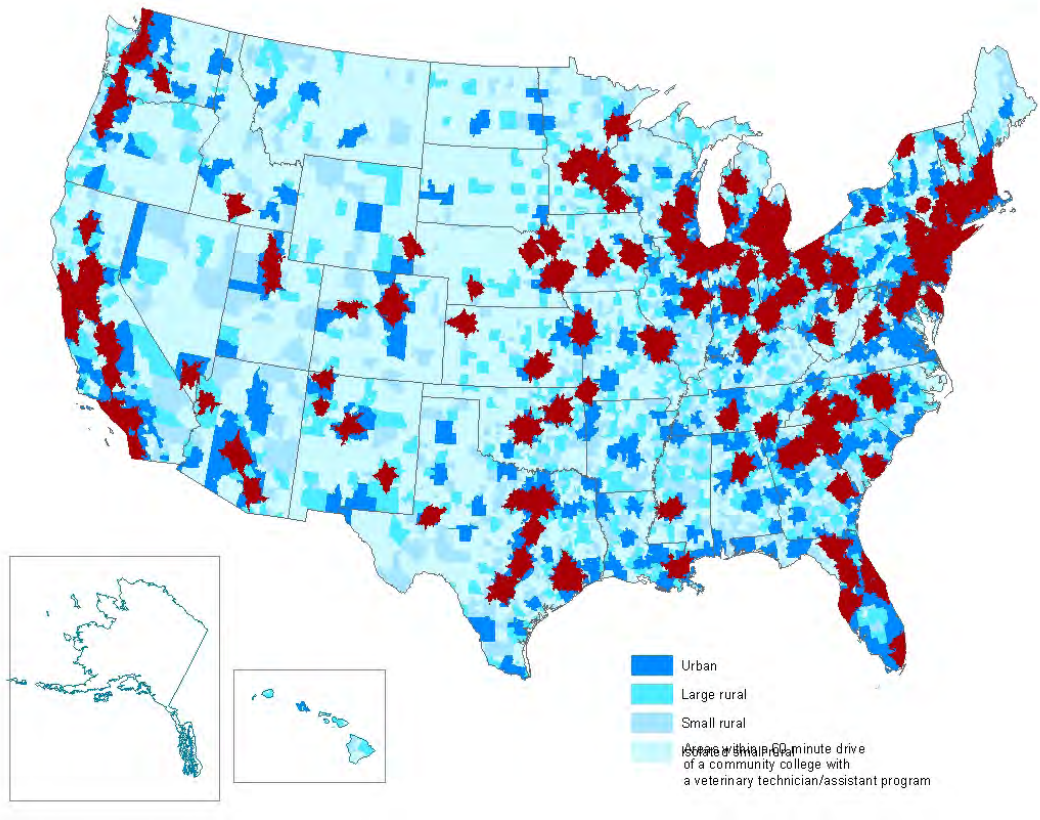
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	172	(100.0%)
Region		
West	54	(31.4%)
Midwest	53	(30.8%)
South	42	(24.4%)
Northeast	23	(13.4%)

Areas Within a 60-Minute Drive of Community Colleges with Veterinary/Animal Health Technician and Veterinary Assistant Education Programs, in Relation to Rural and Urban Areas of the United States



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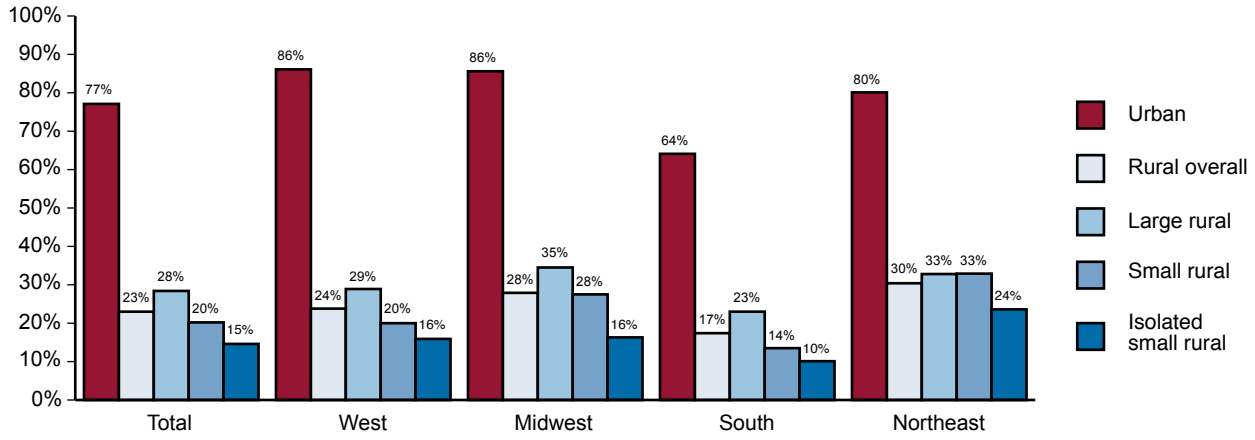
Veterinary/Animal Health Technician and Veterinary Assistant (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Veterinary/Animal Health Technician and Veterinary Assistant Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Veterinary/Animal Health Technician and Veterinary Assistant Program

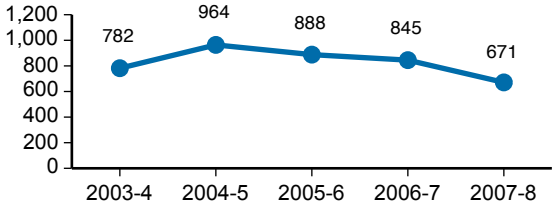
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	204,812,829 (66.9%)	191,498,241 (77.1%)	13,314,588 (23.0%)	8,255,179 (28.4%)	3,045,298 (20.2%)	2,014,111 (14.6%)
Region						
West	55,259,487 (77.6%)	52,969,634 (86.1%)	2,289,853 (23.8%)	1,465,666 (28.9%)	486,865 (20.0%)	337,322 (15.9%)
Midwest	47,998,083 (71.0%)	43,228,836 (85.6%)	4,769,247 (27.9%)	2,804,441 (34.5%)	1,234,614 (27.5%)	730,192 (16.3%)
South	60,148,914 (53.7%)	55,819,725 (64.1%)	4,329,189 (17.4%)	2,827,838 (23.0%)	949,311 (13.5%)	552,040 (10.1%)
Northeast	41,406,345 (74.4%)	39,480,046 (80.1%)	1,926,299 (30.4%)	1,157,234 (32.8%)	374,508 (32.9%)	394,557 (23.6%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	131,889,285 (43.1%)	129,290,584 (52.1%)	2,598,701 (4.5%)	1,934,113 (6.7%)	402,398 (2.7%)	262,190 (1.9%)
Region						
West	42,451,517 (59.6%)	41,775,490 (67.9%)	676,027 (7.0%)	489,086 (9.6%)	108,964 (4.5%)	77,977 (3.7%)
Midwest	29,464,393 (43.6%)	28,872,592 (57.2%)	591,801 (3.5%)	442,907 (5.4%)	89,783 (2.0%)	59,111 (1.3%)
South	33,252,087 (29.7%)	32,239,007 (37.0%)	1,013,080 (4.1%)	851,983 (6.9%)	102,981 (1.5%)	58,116 (1.1%)
Northeast	26,721,288 (48.0%)	26,403,495 (53.6%)	317,793 (5.0%)	150,137 (4.2%)	100,670 (8.8%)	66,986 (4.0%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

CARDIOVASCULAR TECHNOLOGIST

Education Programs in Community Colleges

Community College Program Locations

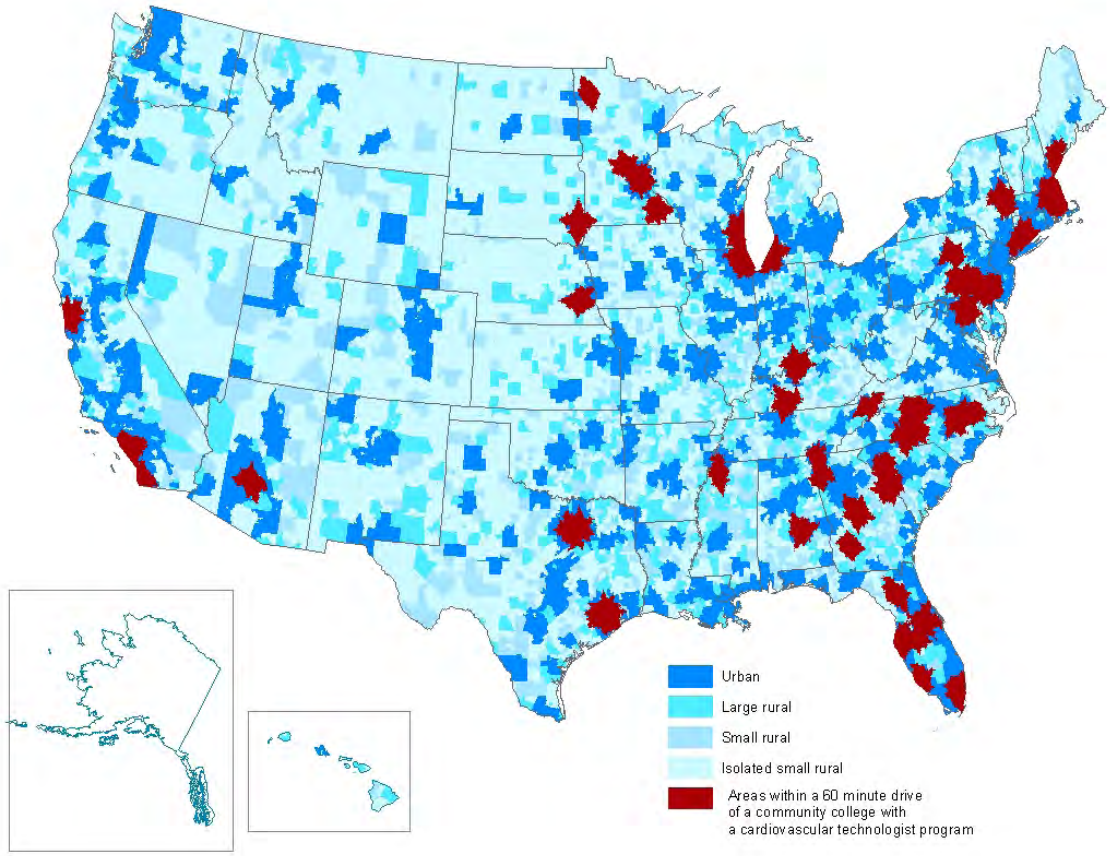
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	49	(100.0%)
Region		
West	4	(8.2%)
Midwest	9	(18.4%)
South	29	(59.2%)
Northeast	7	(14.3%)

Areas Within a 60-Minute Drive of Community Colleges with Cardiovascular Technologist Education Programs, in Relation to Rural and Urban Areas of the United States



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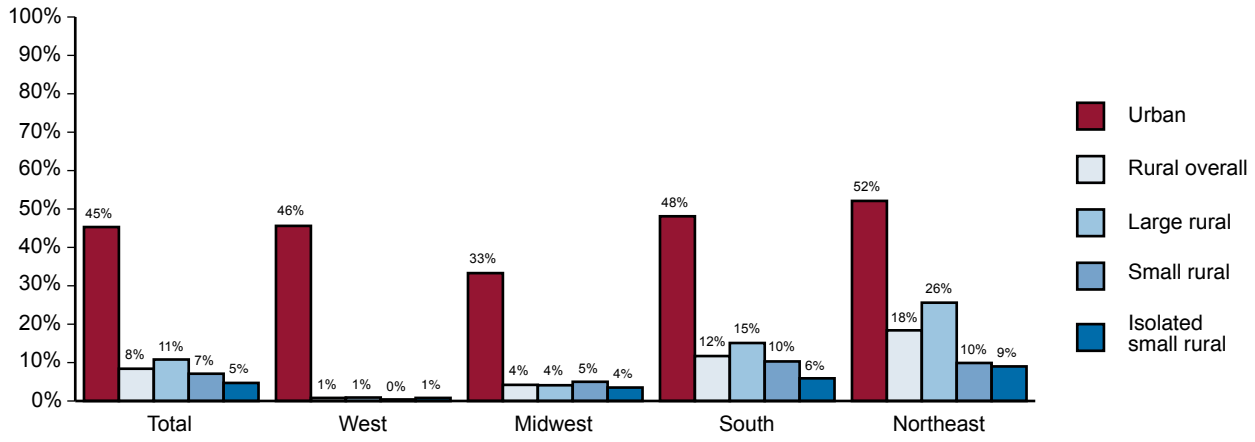
Cardiovascular Technologist (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Cardiovascular Technologist Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Cardiovascular Technologist Program

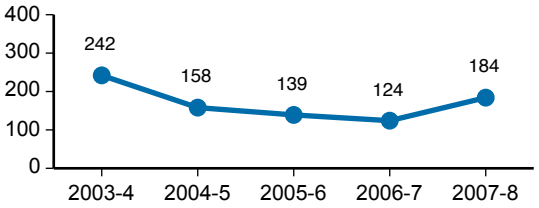
	Total		Urban		Rural							
					Overall		Large Rural		Small Rural		Isolated Small Rural	
60-Minute Drive: Population Within a 60-Minute Drive of a Program												
U.S. overall	117,290,078	(38.3%)	112,431,851	(45.3%)	4,858,227	(8.4%)	3,142,874	(10.8%)	1,072,623	(7.1%)	642,730	(4.7%)
Region												
West	28,137,448	(39.5%)	28,064,176	(45.6%)	73,272	(0.8%)	46,456	(0.9%)	10,609	(0.4%)	16,207	(0.8%)
Midwest	17,522,126	(25.9%)	16,807,759	(33.3%)	714,367	(4.2%)	335,903	(4.1%)	223,023	(5.0%)	155,441	(3.5%)
South	44,783,941	(40.0%)	41,880,790	(48.1%)	2,903,151	(11.7%)	1,855,718	(15.1%)	726,474	(10.3%)	320,959	(5.9%)
Northeast	26,846,563	(48.3%)	25,679,126	(52.1%)	1,167,437	(18.4%)	904,797	(25.6%)	112,517	(9.9%)	150,123	(9.0%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program												
U.S. overall	53,324,053	(17.4%)	52,776,545	(21.2%)	547,508	(0.9%)	364,074	(1.3%)	148,144	(1.0%)	35,290	(0.3%)
Region												
West	12,676,021	(17.8%)	12,676,011	(20.6%)	10	(0.0%)	0	(0.0%)	0	(0.0%)	10	(0.0%)
Midwest	8,984,220	(13.3%)	8,935,321	(17.7%)	48,899	(0.3%)	0	(0.0%)	41,943	(0.9%)	6,956	(0.2%)
South	24,530,064	(21.9%)	24,093,648	(27.7%)	436,416	(1.8%)	312,667	(2.5%)	105,192	(1.5%)	18,557	(0.3%)
Northeast	7,133,748	(12.8%)	7,071,565	(14.3%)	62,183	(1.0%)	51,407	(1.5%)	1,009	(0.1%)	9,767	(0.6%)
Overall 2007 U.S. Population Used for Calculating Percentages Above												
U.S. overall	306,291,398	(100.0%)	248,368,591	(81.1%)	57,922,807	(18.9%)	29,059,549	(9.5%)	15,110,073	(4.9%)	13,753,185	(4.5%)
Region												
West	71,223,932	(100.0%)	61,538,330	(86.4%)	9,632,945	(13.5%)	5,074,588	(7.1%)	2,436,670	(3.4%)	2,121,687	(3.0%)
Midwest	67,561,471	(100.0%)	50,475,215	(74.7%)	17,086,256	(25.3%)	8,131,767	(12.0%)	4,484,133	(6.6%)	4,470,356	(6.6%)
South	111,931,474	(100.0%)	87,068,766	(77.8%)	24,857,538	(22.2%)	12,320,246	(11.0%)	7,051,369	(6.3%)	5,485,923	(4.9%)
Northeast	55,631,348	(100.0%)	49,285,280	(88.6%)	6,346,068	(11.4%)	3,532,948	(6.5%)	1,137,901	(2.0%)	1,675,219	(3.0%)

ELECTROCARDIOGRAPH TECHNICIAN

Education Programs in Community Colleges

Community College Program Locations

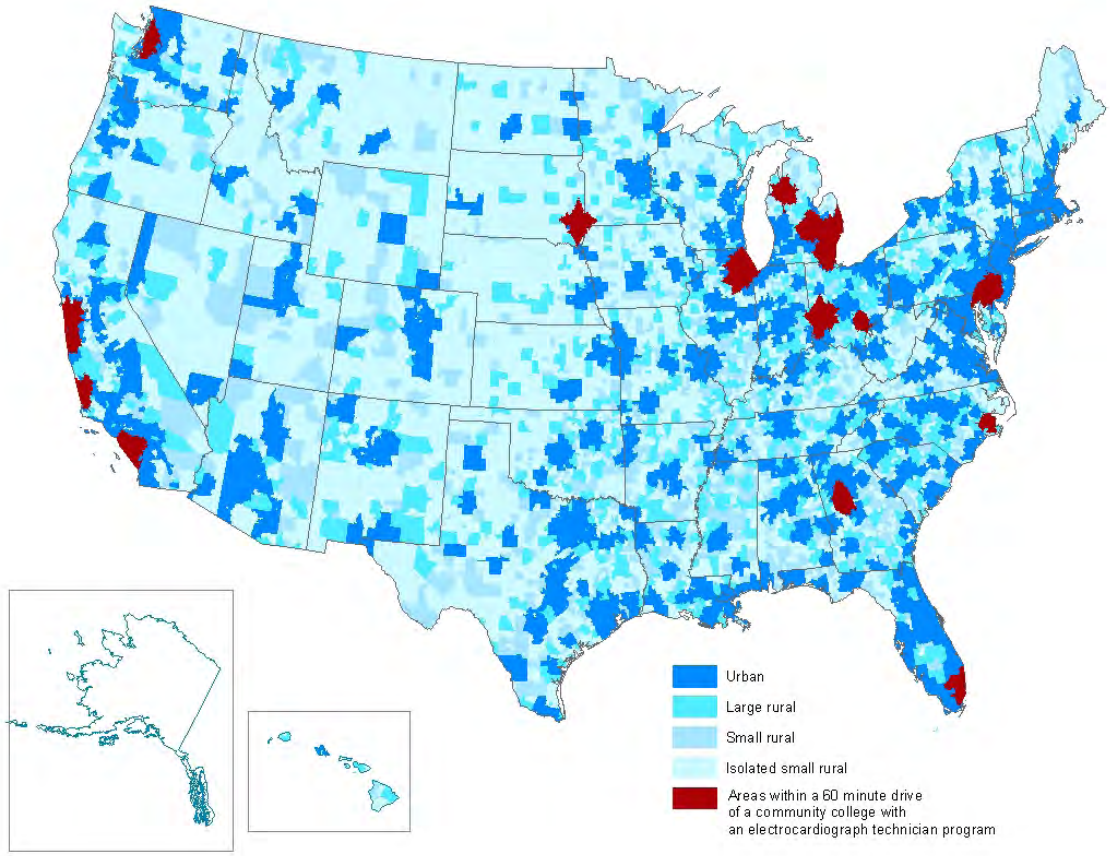
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	19	(100.0%)
Region		
West	5	(26.3%)
Midwest	10	(52.6%)
South	4	(21.1%)
Northeast	0	(0.0%)

Areas Within a 60-Minute Drive of Community Colleges with Electrocardiograph Technician Education Programs, in Relation to Rural and Urban Areas of the United States



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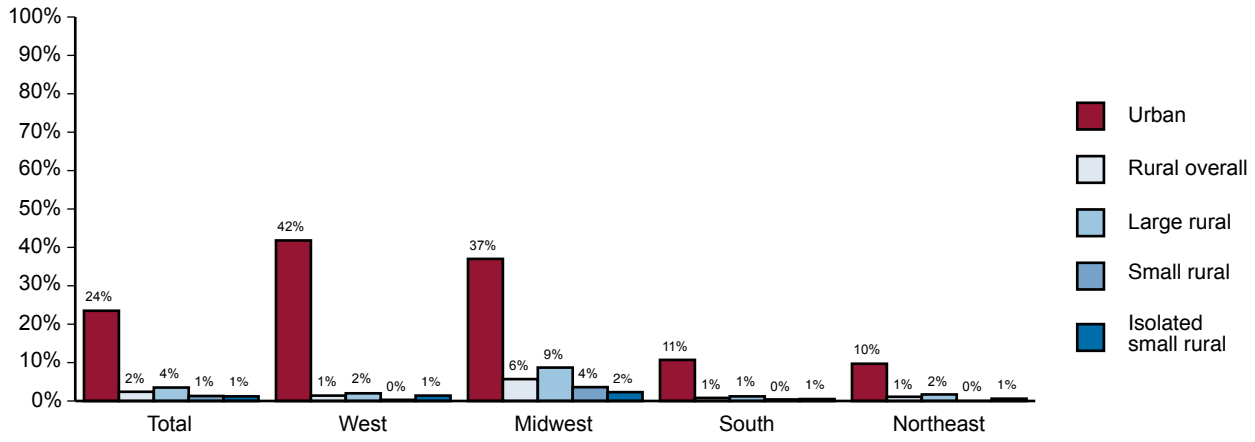
Electrocardiograph Technician (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with an Electrocardiograph Technician Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Electrocardiograph Technician Program

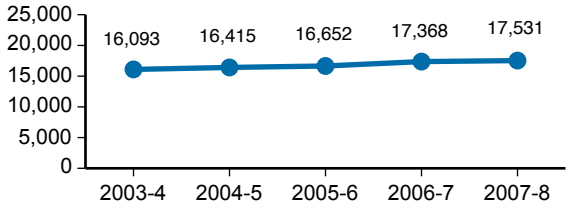
	Total		Urban		Rural							
					Overall		Large Rural		Small Rural		Isolated Small Rural	
60-Minute Drive: Population Within a 60-Minute Drive of a Program												
U.S. overall	59,843,312	(19.5%)	58,470,627	(23.5%)	1,372,685	(2.4%)	1,013,197	(3.5%)	193,284	(1.3%)	166,204	(1.2%)
Region												
West	25,834,769	(36.3%)	25,698,096	(41.8%)	136,673	(1.4%)	100,570	(2.0%)	6,565	(0.3%)	29,538	(1.4%)
Midwest	19,630,076	(29.1%)	18,660,459	(37.0%)	969,617	(5.7%)	707,037	(8.7%)	161,498	(3.6%)	101,082	(2.3%)
South	9,550,727	(8.5%)	9,352,485	(10.7%)	198,242	(0.8%)	147,056	(1.2%)	25,221	(0.4%)	25,965	(0.5%)
Northeast	4,827,740	(8.7%)	4,759,587	(9.7%)	68,153	(1.1%)	58,534	(1.7%)	0	(0.0%)	9,619	(0.6%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program												
U.S. overall	23,590,045	(7.7%)	23,340,355	(9.4%)	249,690	(0.4%)	196,266	(0.7%)	24,616	(0.2%)	28,808	(0.2%)
Region												
West	9,642,529	(13.5%)	9,582,106	(15.6%)	60,423	(0.6%)	57,583	(1.1%)	0	(0.0%)	2,840	(0.1%)
Midwest	9,104,731	(13.5%)	8,947,676	(17.7%)	157,055	(0.9%)	121,004	(1.5%)	24,616	(0.5%)	11,435	(0.3%)
South	4,311,253	(3.9%)	4,279,041	(4.9%)	32,212	(0.1%)	17,679	(0.1%)	0	(0.0%)	14,533	(0.3%)
Northeast	531,532	(1.0%)	531,532	(1.1%)	0	(0.0%)	0	(0.0%)	0	(0.0%)	0	(0.0%)
Overall 2007 U.S. Population Used for Calculating Percentages Above												
U.S. overall	306,291,398	(100.0%)	248,368,591	(81.1%)	57,922,807	(18.9%)	29,059,549	(9.5%)	15,110,073	(4.9%)	13,753,185	(4.5%)
Region												
West	71,223,932	(100.0%)	61,538,330	(86.4%)	9,632,945	(13.5%)	5,074,588	(7.1%)	2,436,670	(3.4%)	2,121,687	(3.0%)
Midwest	67,561,471	(100.0%)	50,475,215	(74.7%)	17,086,256	(25.3%)	8,131,767	(12.0%)	4,484,133	(6.6%)	4,470,356	(6.6%)
South	111,931,474	(100.0%)	87,068,766	(77.8%)	24,857,538	(22.2%)	12,320,246	(11.0%)	7,051,369	(6.3%)	5,485,923	(4.9%)
Northeast	55,631,348	(100.0%)	49,285,280	(88.6%)	6,346,068	(11.4%)	3,532,948	(6.5%)	1,137,901	(2.0%)	1,675,219	(3.0%)

EMERGENCY MEDICAL TECHNICIAN (EMT PARAMEDIC)

Education Programs in Community Colleges

Community College Program Locations

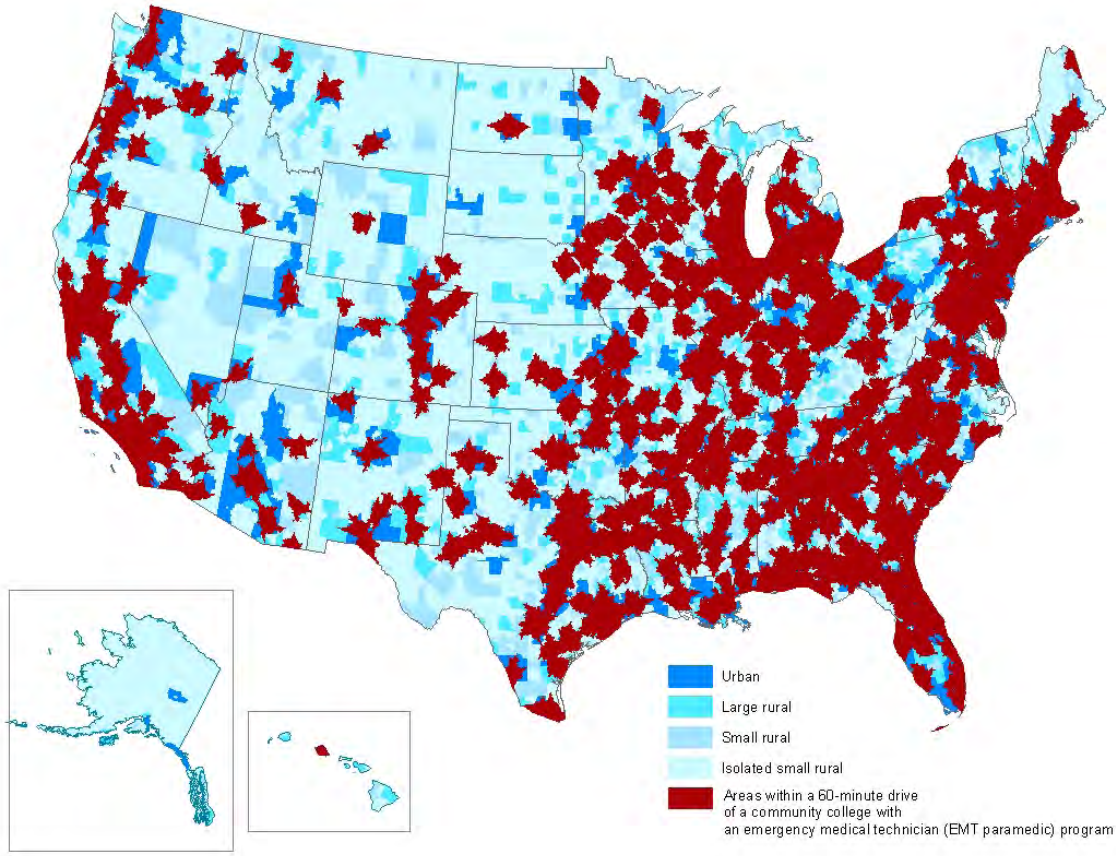
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	537	(100.0%)
Region		
West	130	(24.2%)
Midwest	133	(24.8%)
South	236	(43.9%)
Northeast	38	(7.1%)

Areas Within a 60-Minute Drive of Community Colleges with Emergency Medical Technician (EMT Paramedic) Education Programs, in Relation to Rural and Urban Areas of the United States



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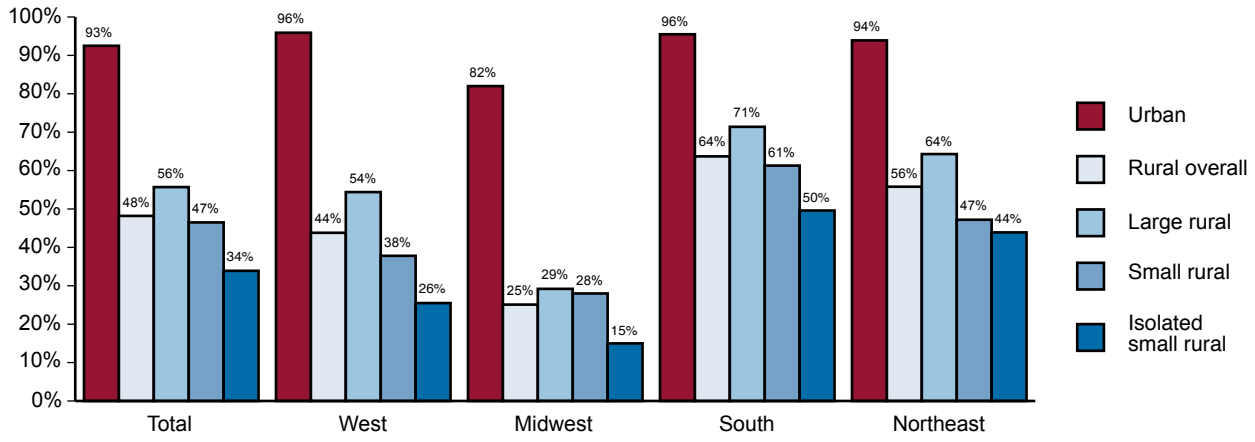
Emergency Medical Technician (EMT Paramedic) (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with an Emergency Medical Technician (EMT Paramedic) Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Emergency Medical Technician (EMT Paramedic) Program

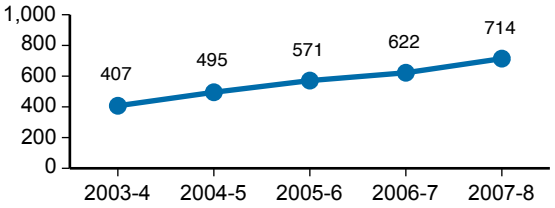
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	257,662,447 (84.1%)	229,769,482 (92.5%)	27,892,965 (48.2%)	16,195,726 (55.7%)	7,031,746 (46.5%)	4,665,493 (33.9%)
Region						
West	63,214,465 (88.8%)	58,993,733 (95.9%)	4,220,732 (43.8%)	2,759,075 (54.4%)	920,546 (37.8%)	541,111 (25.5%)
Midwest	45,664,717 (67.6%)	41,368,701 (82.0%)	4,296,016 (25.1%)	2,373,475 (29.2%)	1,254,150 (28.0%)	668,391 (15.0%)
South	98,949,666 (88.4%)	83,117,153 (95.5%)	15,832,513 (63.7%)	8,791,961 (71.4%)	4,320,192 (61.3%)	2,720,360 (49.6%)
Northeast	49,833,599 (89.6%)	46,289,895 (93.9%)	3,543,704 (55.8%)	2,271,215 (64.3%)	536,858 (47.2%)	735,631 (43.9%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	198,104,818 (64.7%)	188,097,742 (75.7%)	10,007,076 (17.3%)	7,004,333 (24.1%)	2,118,414 (14.0%)	884,329 (6.4%)
Region						
West	55,196,835 (77.5%)	53,077,165 (86.3%)	2,119,670 (22.0%)	1,667,882 (32.9%)	335,682 (13.8%)	116,106 (5.5%)
Midwest	39,628,770 (58.7%)	37,197,152 (73.7%)	2,431,618 (14.2%)	1,508,133 (18.5%)	691,540 (15.4%)	231,945 (5.2%)
South	70,290,948 (62.8%)	65,656,079 (75.4%)	4,634,869 (18.6%)	3,203,271 (26.0%)	983,315 (13.9%)	448,283 (8.2%)
Northeast	32,988,265 (59.3%)	32,167,346 (65.3%)	820,919 (12.9%)	625,047 (17.7%)	107,877 (9.5%)	87,995 (5.3%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

NUCLEAR MEDICAL TECHNOLOGIST

Education Programs in Community Colleges

Community College Program Locations

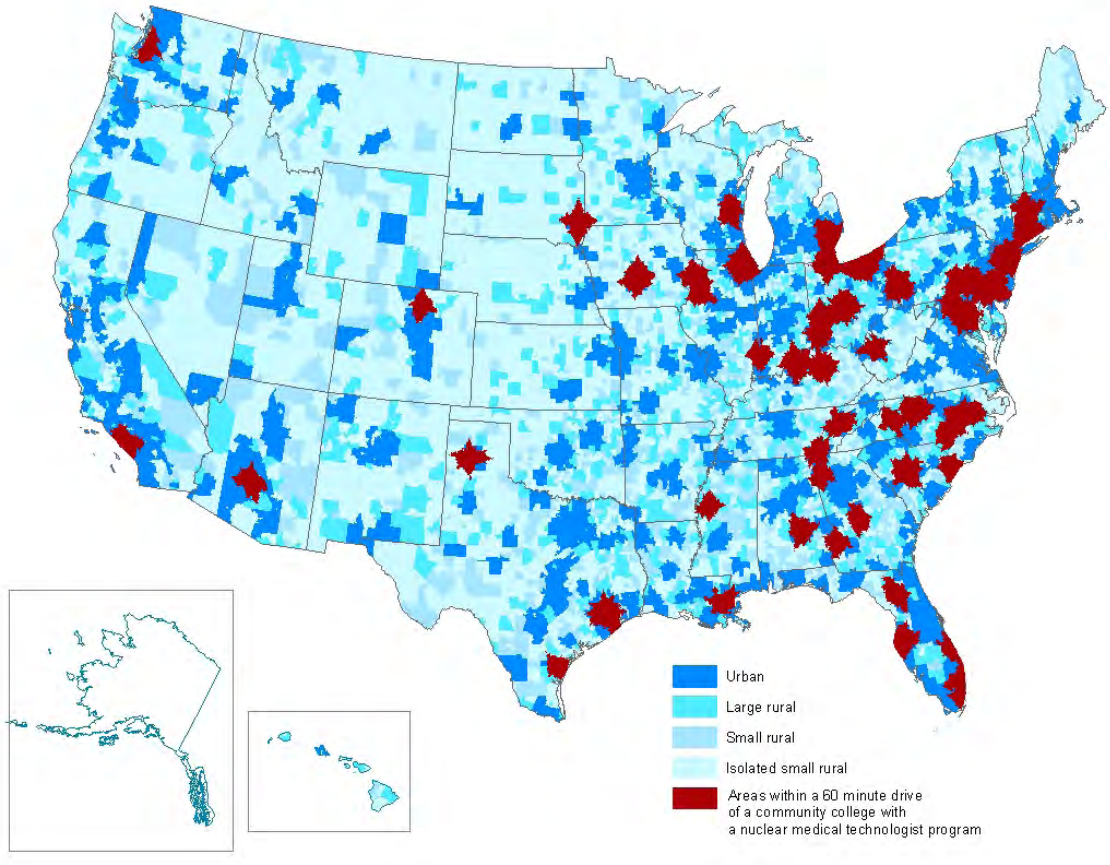
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	59	(100.0%)
Region		
West	4	(6.8%)
Midwest	16	(27.1%)
South	31	(52.5%)
Northeast	8	(13.6%)

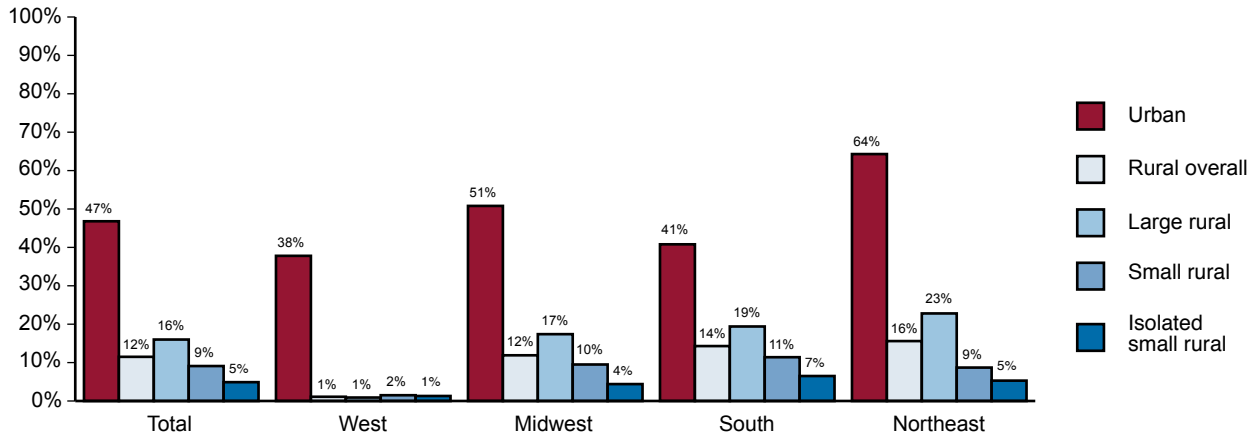
Areas Within a 60-Minute Drive of Community Colleges with Nuclear Medical Technologist Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Nuclear Medical Technologist (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Nuclear Medical Technologist Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Nuclear Medical Technologist Program

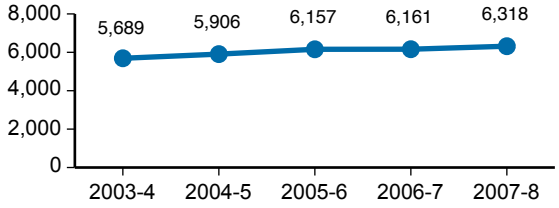
	Total		Urban		Rural							
					Overall		Large Rural		Small Rural		Isolated Small Rural	
60-Minute Drive: Population Within a 60-Minute Drive of a Program												
U.S. overall	122,823,064	(40.1%)	116,134,400	(46.8%)	6,688,664	(11.5%)	4,649,120	(16.0%)	1,369,453	(9.1%)	670,091	(4.9%)
Region												
West	23,388,058	(32.8%)	23,277,728	(37.8%)	110,330	(1.1%)	46,456	(0.9%)	37,261	(1.5%)	26,613	(1.3%)
Midwest	27,688,548	(41.0%)	25,652,830	(50.8%)	2,035,718	(11.9%)	1,411,613	(17.4%)	425,920	(9.5%)	198,185	(4.4%)
South	39,046,325	(34.9%)	35,494,948	(40.8%)	3,551,377	(14.3%)	2,387,193	(19.4%)	806,963	(11.4%)	357,221	(6.5%)
Northeast	32,700,133	(58.8%)	31,708,894	(64.3%)	991,239	(15.6%)	803,858	(22.8%)	99,309	(8.7%)	88,072	(5.3%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program												
U.S. overall	70,620,038	(23.1%)	69,930,317	(28.2%)	689,721	(1.2%)	546,418	(1.9%)	112,029	(0.7%)	31,274	(0.2%)
Region												
West	14,946,473	(21.0%)	14,928,953	(24.3%)	17,520	(0.2%)	0	(0.0%)	17,510	(0.7%)	10	(0.0%)
Midwest	16,950,740	(25.1%)	16,750,883	(33.2%)	199,857	(1.2%)	161,091	(2.0%)	22,294	(0.5%)	16,472	(0.4%)
South	22,156,662	(19.8%)	21,733,952	(25.0%)	422,710	(1.7%)	344,020	(2.8%)	72,225	(1.0%)	6,465	(0.1%)
Northeast	16,566,163	(29.8%)	16,516,529	(33.5%)	49,634	(0.8%)	41,307	(1.2%)	0	(0.0%)	8,327	(0.5%)
Overall 2007 U.S. Population Used for Calculating Percentages Above												
U.S. overall	306,291,398	(100.0%)	248,368,591	(81.1%)	57,922,807	(18.9%)	29,059,549	(9.5%)	15,110,073	(4.9%)	13,753,185	(4.5%)
Region												
West	71,223,932	(100.0%)	61,538,330	(86.4%)	9,632,945	(13.5%)	5,074,588	(7.1%)	2,436,670	(3.4%)	2,121,687	(3.0%)
Midwest	67,561,471	(100.0%)	50,475,215	(74.7%)	17,086,256	(25.3%)	8,131,767	(12.0%)	4,484,133	(6.6%)	4,470,356	(6.6%)
South	111,931,474	(100.0%)	87,068,766	(77.8%)	24,857,538	(22.2%)	12,320,246	(11.0%)	7,051,369	(6.3%)	5,485,923	(4.9%)
Northeast	55,631,348	(100.0%)	49,285,280	(88.6%)	6,346,068	(11.4%)	3,532,948	(6.5%)	1,137,901	(2.0%)	1,675,219	(3.0%)

RADIATION THERAPIST (MEDICAL RADIOLOGIC TECHNOLOGY/SCIENCE)

Education Programs in Community Colleges

Community College Program Locations

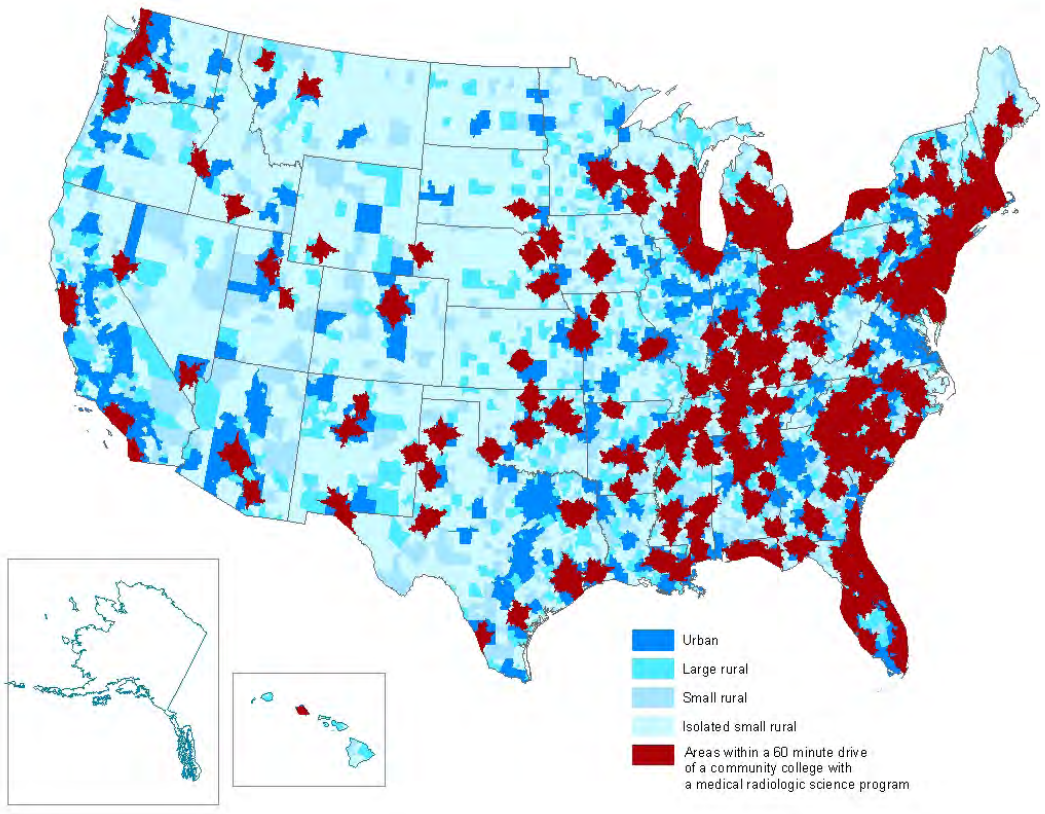
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	269	(100.0%)
Region		
West	36	(13.4%)
Midwest	55	(20.4%)
South	131	(48.7%)
Northeast	47	(17.5%)

Areas Within a 60-Minute Drive of Community Colleges with Radiation Therapist (Medical Radiologic Technology/Science) Education Programs, in Relation to Rural and Urban Areas of the United States



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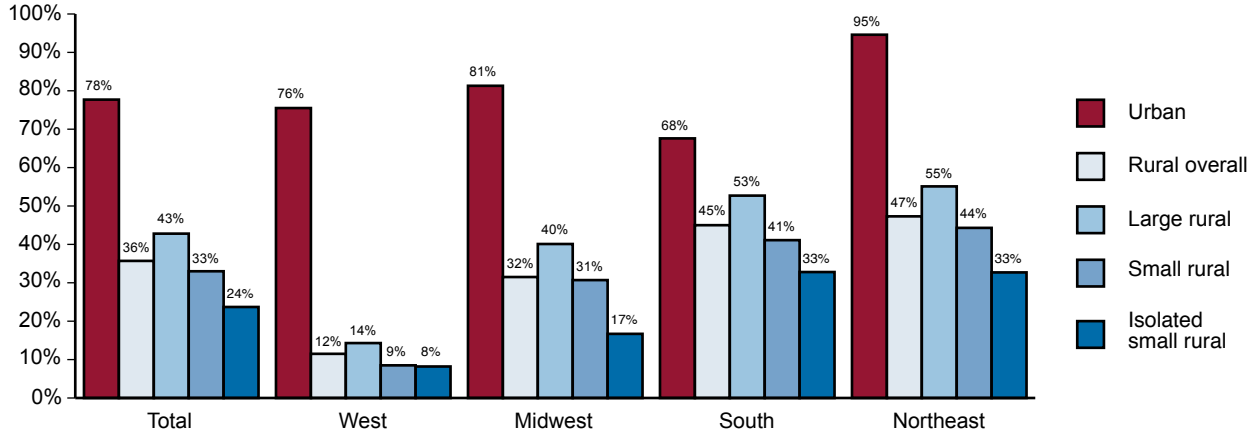
Radiation Therapist (Medical Radiologic Technology/Science) (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Radiation Therapist (Medical Radiologic Technology/Science) Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Radiation Therapist (Medical Radiologic Technology/Science) Program

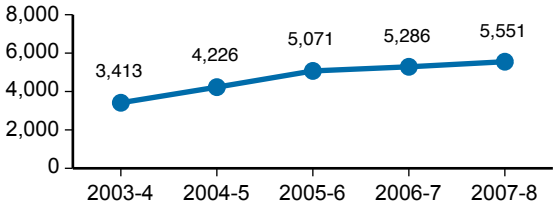
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	213,648,214 (69.8%)	192,965,808 (77.7%)	20,682,406 (35.7%)	12,430,453 (42.8%)	4,986,593 (33.0%)	3,265,360 (23.7%)
Region						
West	47,572,794 (66.8%)	46,464,677 (75.5%)	1,108,117 (11.5%)	726,755 (14.3%)	208,249 (8.5%)	173,113 (8.2%)
Midwest	46,425,172 (68.7%)	41,039,958 (81.3%)	5,385,214 (31.5%)	3,261,993 (40.1%)	1,377,983 (30.7%)	745,238 (16.7%)
South	70,036,602 (62.6%)	58,846,370 (67.6%)	11,190,232 (45.0%)	6,493,956 (52.7%)	2,896,737 (41.1%)	1,799,539 (32.8%)
Northeast	49,613,646 (89.2%)	46,614,803 (94.6%)	2,998,843 (47.3%)	1,947,749 (55.1%)	503,624 (44.3%)	547,470 (32.7%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	147,676,665 (48.2%)	142,283,316 (57.3%)	5,393,349 (9.3%)	4,157,659 (14.3%)	887,287 (5.9%)	348,403 (2.5%)
Region						
West	33,719,716 (47.3%)	33,341,044 (54.2%)	378,672 (3.9%)	302,562 (6.0%)	55,373 (2.3%)	20,737 (1.0%)
Midwest	30,572,315 (45.3%)	29,331,024 (58.1%)	1,241,291 (7.3%)	911,915 (11.2%)	246,447 (5.5%)	82,929 (1.9%)
South	46,104,896 (41.2%)	42,990,167 (49.4%)	3,114,729 (12.5%)	2,377,400 (19.3%)	531,606 (7.5%)	205,723 (3.8%)
Northeast	37,279,738 (67.0%)	36,621,081 (74.3%)	658,657 (10.4%)	565,782 (16.0%)	53,861 (4.7%)	39,014 (2.3%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

RESPIRATORY CARE THERAPIST

Education Programs in Community Colleges

Community College Program Locations

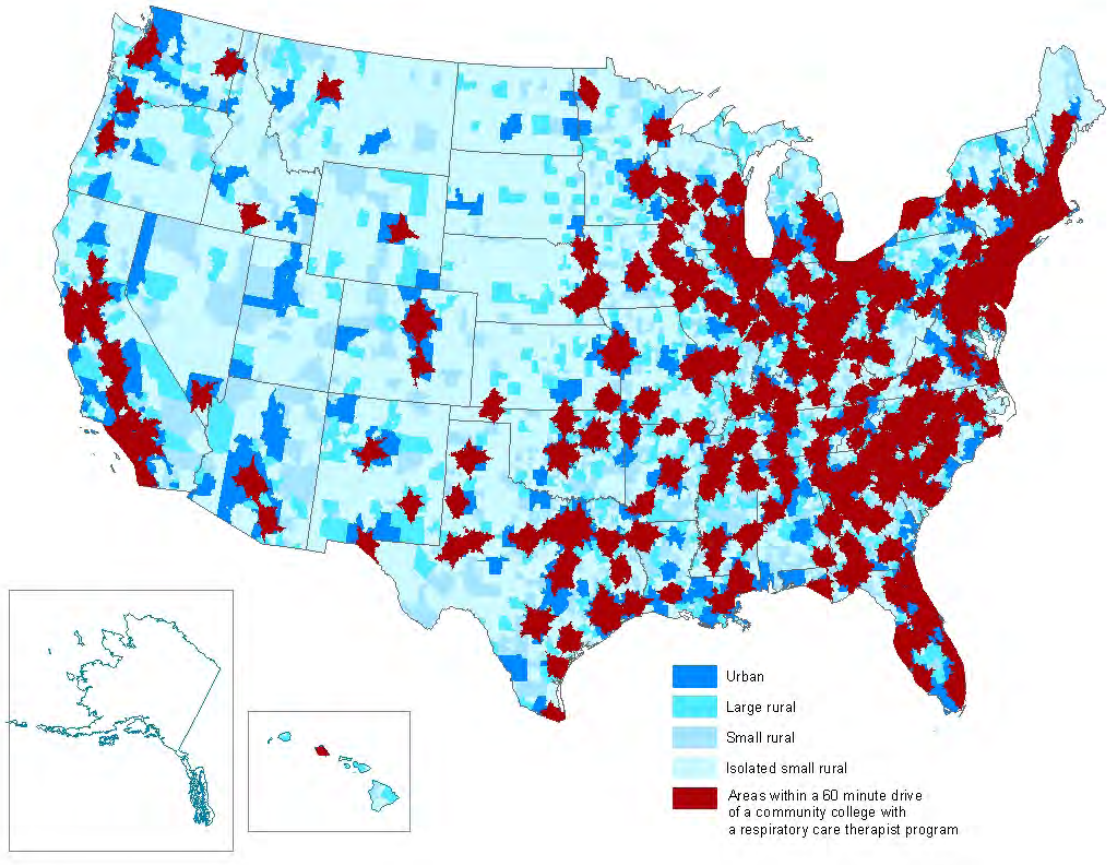
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	297	(100.0%)
Region		
West	52	(17.5%)
Midwest	67	(22.6%)
South	137	(46.1%)
Northeast	41	(13.8%)

Areas Within a 60-Minute Drive of Community Colleges with Respiratory Care Therapist Education Programs, in Relation to Rural and Urban Areas of the United States



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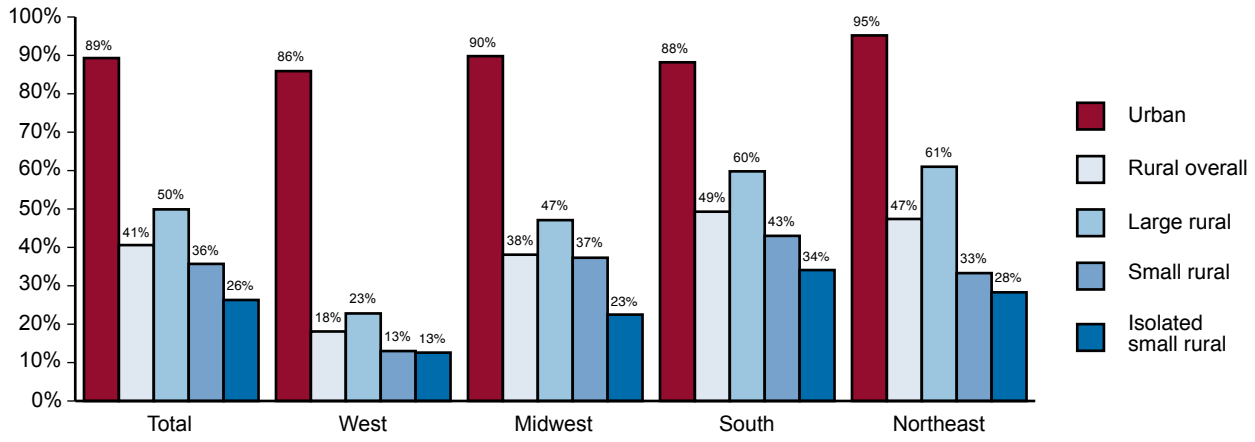
Respiratory Care Therapist (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Respiratory Care Therapist Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Respiratory Care Therapist Program

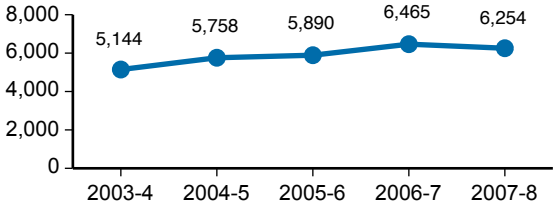
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	245,370,533 (80.1%)	221,857,473 (89.3%)	23,513,060 (40.6%)	14,498,909 (49.9%)	5,398,415 (35.7%)	3,615,736 (26.3%)
Region						
West	54,597,010 (76.7%)	52,856,828 (85.9%)	1,740,182 (18.1%)	1,156,473 (22.8%)	317,272 (13.0%)	266,437 (12.6%)
Midwest	51,820,722 (76.7%)	45,315,898 (89.8%)	6,504,824 (38.1%)	3,826,102 (47.1%)	1,672,300 (37.3%)	1,006,422 (22.5%)
South	89,048,019 (79.6%)	76,787,667 (88.2%)	12,260,352 (49.3%)	7,361,552 (59.8%)	3,029,626 (43.0%)	1,869,174 (34.1%)
Northeast	49,904,782 (89.7%)	46,897,080 (95.2%)	3,007,702 (47.4%)	2,154,782 (61.0%)	379,217 (33.3%)	473,703 (28.3%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	179,391,130 (58.6%)	174,198,764 (70.1%)	5,192,366 (9.0%)	3,896,130 (13.4%)	907,881 (6.0%)	388,355 (2.8%)
Region						
West	45,181,678 (6.34%)	44,611,055 (72.5%)	570,623 (5.9%)	452,217 (8.9%)	57,273 (2.4%)	61,133 (2.9%)
Midwest	36,266,943 (53.7%)	35,240,643 (69.8%)	1,026,300 (6.0%)	726,843 (8.9%)	241,116 (5.4%)	58,341 (1.3%)
South	59,823,501 (53.4%)	56,727,366 (65.2%)	3,096,135 (12.5%)	2,354,870 (19.1%)	507,928 (7.2%)	233,337 (4.3%)
Northeast	38,119,008 (68.5%)	37,619,700 (76.3%)	499,308 (7.9%)	362,200 (10.3%)	101,564 (8.9%)	35,544 (2.1%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

SURGICAL TECHNOLOGIST

Education Programs in Community Colleges

Community College Program Locations

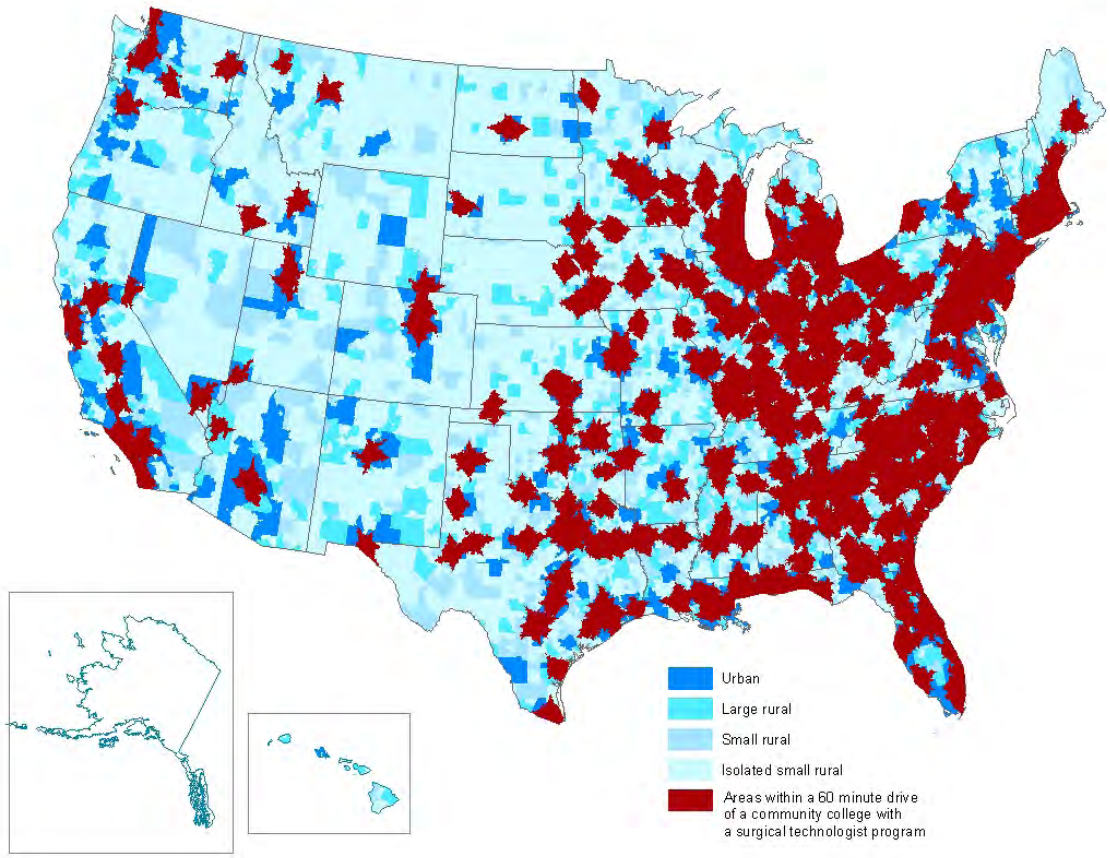
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	384	(100.0%)
Region		
West	43	(11.2%)
Midwest	109	(28.4%)
South	197	(51.3%)
Northeast	35	(9.1%)

Areas Within a 60-Minute Drive of Community Colleges with Surgical Technologist Education Programs, in Relation to Rural and Urban Areas of the United States



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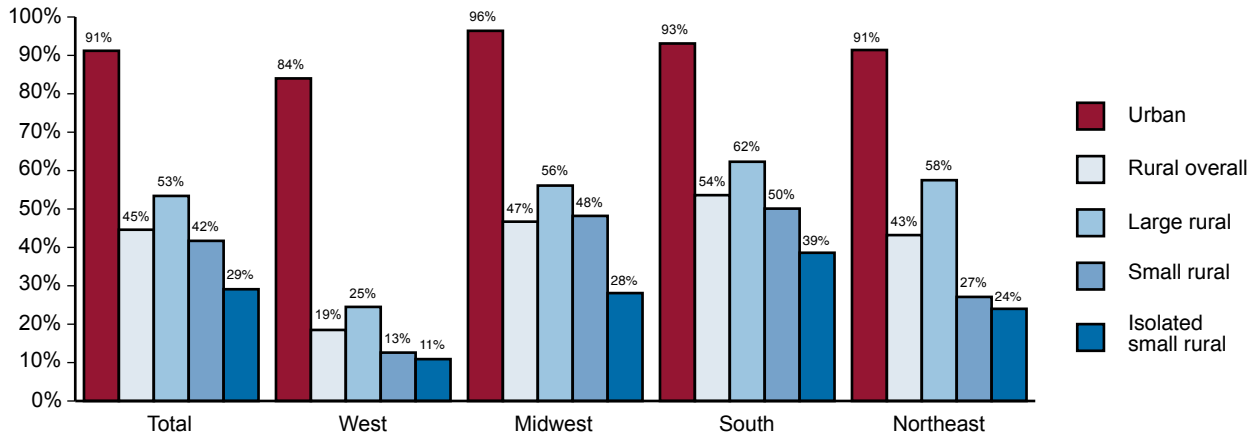
Surgical Technologist (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Surgical Technologist Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Surgical Technologist Program

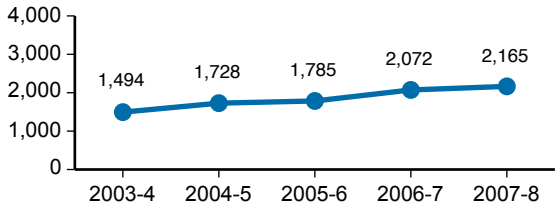
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	252,304,383 (82.4%)	226,480,069 (91.2%)	25,824,314 (44.6%)	15,507,900 (53.4%)	6,308,198 (41.7%)	4,008,216 (29.1%)
Region						
West	53,502,169 (75.1%)	51,718,960 (84.0%)	1,783,209 (18.5%)	1,245,548 (24.5%)	305,962 (12.6%)	231,699 (10.9%)
Midwest	56,622,594 (83.8%)	48,649,741 (96.4%)	7,972,853 (46.7%)	4,558,030 (56.1%)	2,160,650 (48.2%)	1,254,173 (28.1%)
South	94,411,230 (84.3%)	81,084,450 (93.1%)	13,326,780 (53.6%)	7,673,959 (62.3%)	3,532,978 (50.1%)	2,119,843 (38.6%)
Northeast	47,768,390 (85.9%)	45,026,918 (91.4%)	2,741,472 (43.2%)	2,030,363 (57.5%)	308,608 (27.1%)	402,501 (24.0%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	184,349,850 (60.2%)	178,612,964 (71.9%)	5,736,886 (9.9%)	4,274,414 (14.7%)	999,154 (6.6%)	463,318 (3.4%)
Region						
West	41,592,434 (58.4%)	41,263,320 (67.1%)	329,114 (3.4%)	226,410 (4.5%)	63,186 (2.6%)	39,518 (1.9%)
Midwest	42,651,553 (63.1%)	41,113,241 (81.5%)	1,538,312 (9.0%)	1,188,784 (14.6%)	255,123 (5.7%)	94,405 (2.1%)
South	66,015,169 (59.0%)	62,470,987 (71.7%)	3,544,182 (14.3%)	2,581,434 (21.0%)	660,385 (9.4%)	302,363 (5.5%)
Northeast	34,090,694 (61.3%)	33,765,416 (68.5%)	325,278 (5.1%)	277,786 (7.9%)	20,460 (1.8%)	27,032 (1.6%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

DIAGNOSTIC MEDICAL SONOGRAPHER AND ULTRASOUND TECHNICIAN

Education Programs in Community Colleges

Community College Program Locations

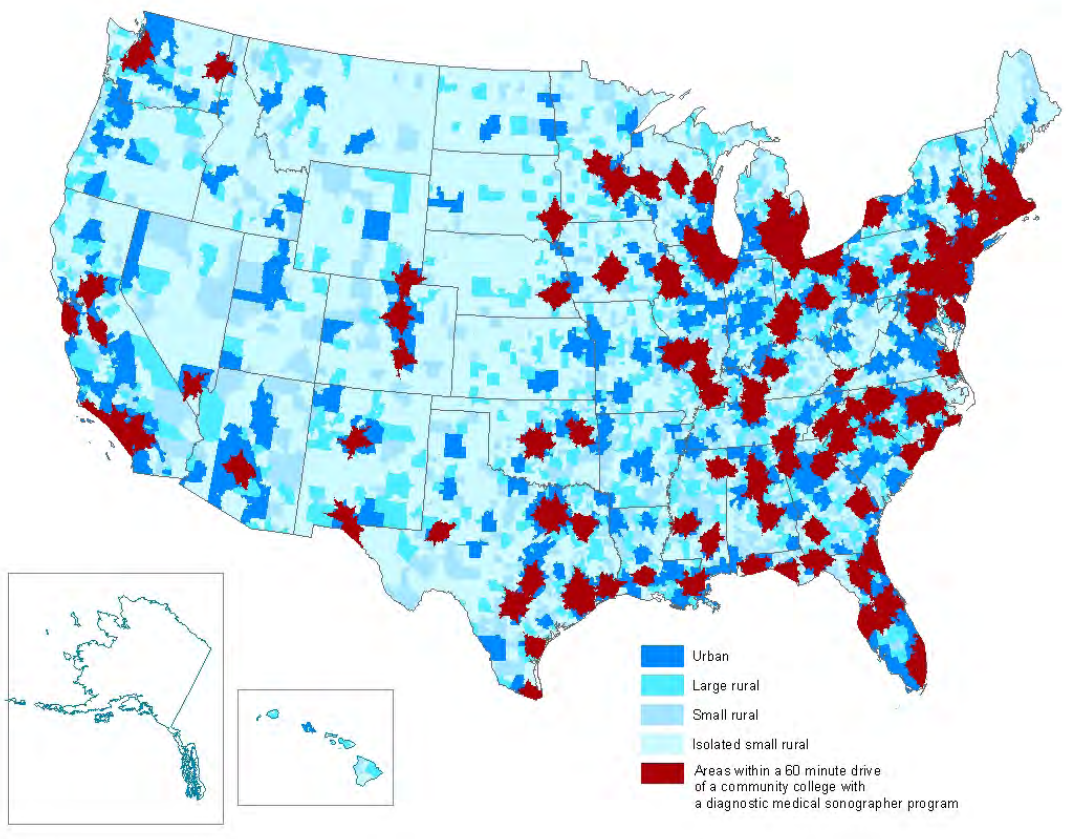
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	138	(100.0%)
Region		
West	20	(14.5%)
Midwest	32	(23.2%)
South	66	(47.8%)
Northeast	20	(14.5%)

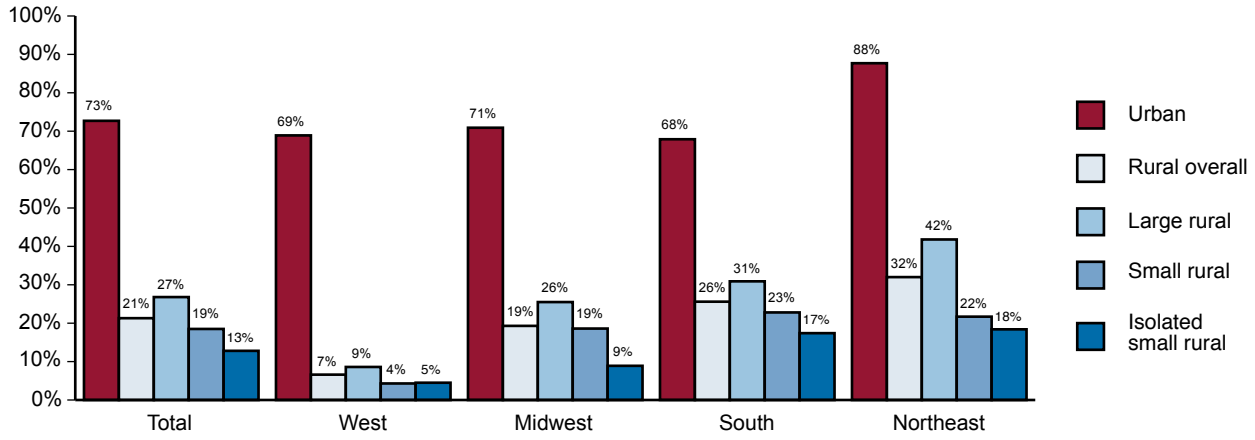
Areas Within a 60-Minute Drive of Community Colleges with Diagnostic Medical Sonographer and Ultrasound Technician Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Diagnostic Medical Sonographer and Ultrasound Technician (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Diagnostic Medical Sonographer and Ultrasound Technician Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Diagnostic Medical Sonographer and Ultrasound Technician Program

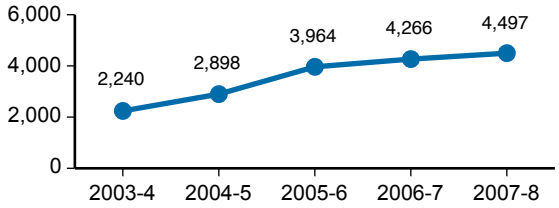
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	192,785,034 (62.9%)	180,449,286 (72.7%)	12,335,748 (21.3%)	7,788,888 (26.8%)	2,790,844 (18.5%)	1,756,016 (12.8%)
Region						
West	43,005,265 (60.4%)	42,370,373 (68.9%)	634,892 (6.6%)	434,413 (8.6%)	105,049 (4.3%)	95,430 (4.5%)
Midwest	39,085,180 (57.9%)	35,782,606 (70.9%)	3,302,574 (19.3%)	2,070,095 (25.5%)	833,200 (18.6%)	399,279 (8.9%)
South	65,454,470 (58.5%)	59,086,706 (67.9%)	6,367,764 (25.6%)	3,807,820 (30.9%)	1,606,063 (22.8%)	953,881 (17.4%)
Northeast	45,240,119 (81.3%)	43,209,601 (87.7%)	2,030,518 (32.0%)	1,476,560 (41.8%)	246,532 (21.7%)	307,426 (18.4%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	120,381,842 (39.3%)	118,469,202 (47.7%)	1,912,640 (3.3%)	1,448,738 (5.0%)	275,572 (1.8%)	188,330 (1.4%)
Region						
West	31,409,529 (44.1%)	31,373,862 (51.0%)	35,667 (0.4%)	15,638 (0.3%)	9,031 (0.4%)	10,998 (0.5%)
Midwest	24,485,491 (36.2%)	24,024,972 (47.6%)	460,519 (2.7%)	366,885 (4.5%)	67,699 (1.5%)	25,935 (0.6%)
South	39,207,071 (35.0%)	37,991,333 (43.6%)	1,215,738 (4.9%)	901,100 (7.3%)	195,933 (2.8%)	118,705 (2.2%)
Northeast	25,279,751 (45.4%)	25,079,035 (50.9%)	200,716 (3.2%)	165,115 (4.7%)	2,909 (0.3%)	32,692 (2.0%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

RADIOGRAPHER (RADIOLOGIC TECHNOLOGY/SCIENCE)

Education Programs in Community Colleges

Community College Program Locations

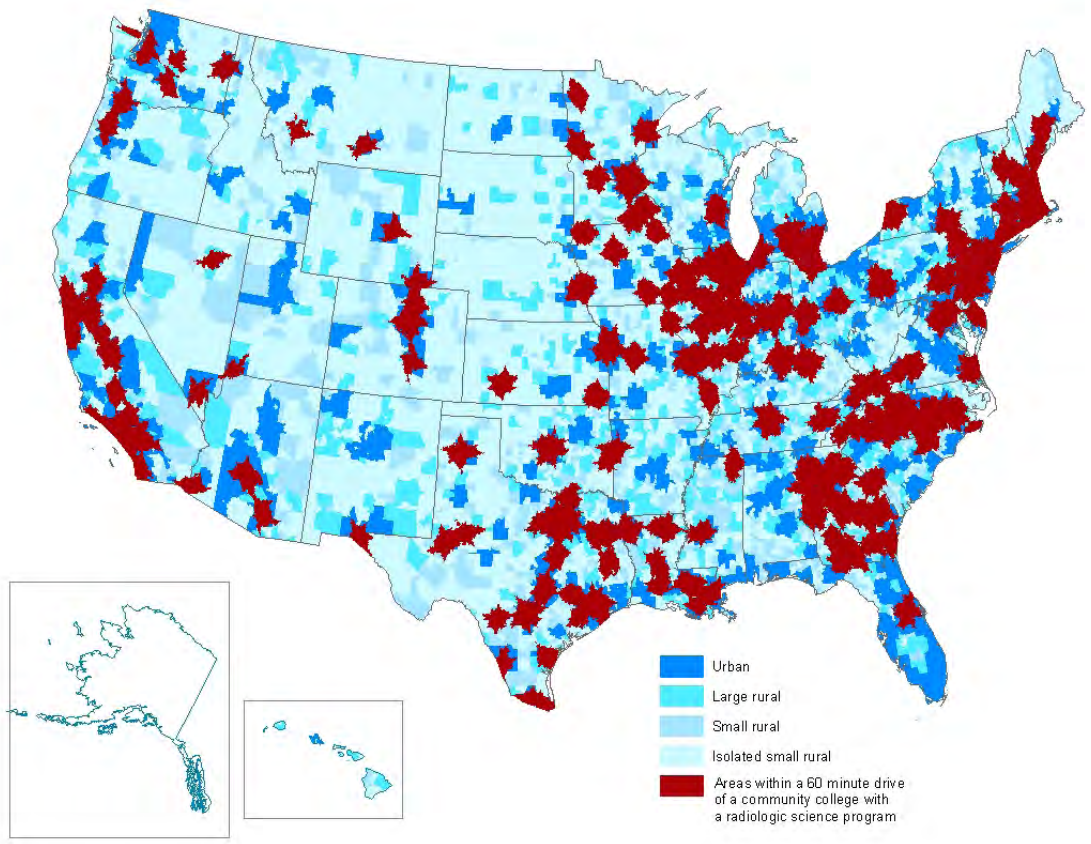
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	215	(100.0%)
Region		
West	47	(21.9%)
Midwest	56	(26.0%)
South	92	(42.8%)
Northeast	20	(9.3%)

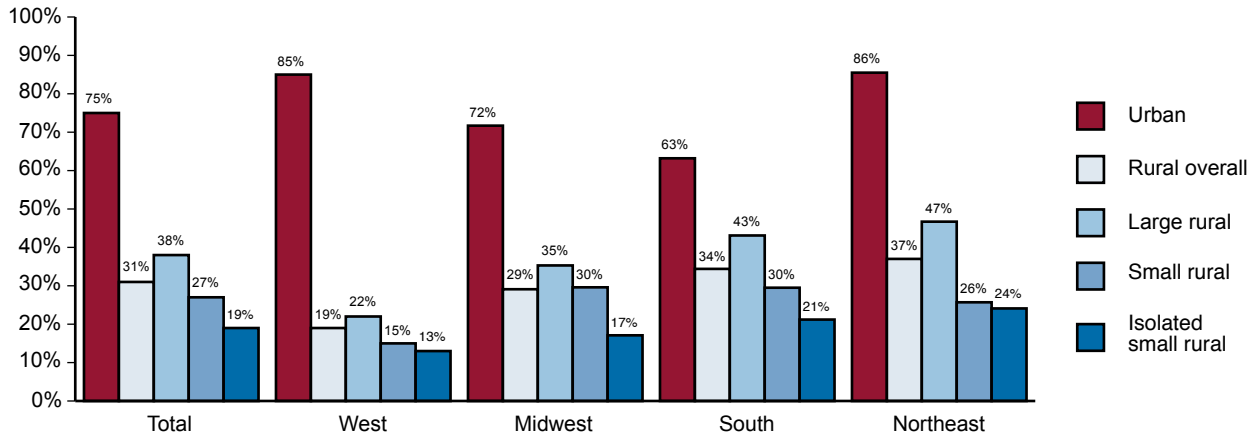
Areas Within a 60-Minute Drive of Community Colleges with Radiographer (Radiologic Technology/Science) Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Radiographer (Radiologic Technology/Science) (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Radiographer (Radiologic Technology/Science) Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Radiographer (Radiologic Technology/Science) Program

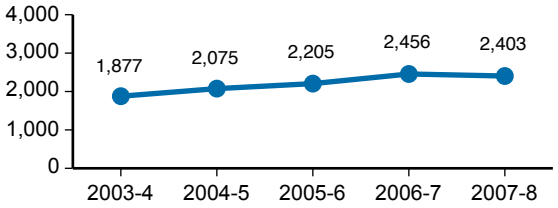
	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	202,985,772 (66.3%)	185,322,066 (74.6%)	17,663,706 (30.5%)	10,971,207 (37.8%)	4,077,553 (27.0%)	2,614,946 (19.0%)
Region						
West	53,801,304 (75.5%)	52,010,219 (84.5%)	1,791,085 (18.6%)	1,138,276 (22.4%)	373,613 (15.3%)	279,196 (13.2%)
Midwest	41,138,651 (60.9%)	36,173,443 (71.7%)	4,965,208 (29.1%)	2,871,809 (35.3%)	1,327,487 (29.6%)	765,912 (17.1%)
South	63,569,414 (56.8%)	55,007,794 (63.2%)	8,561,620 (34.4%)	5,312,427 (43.1%)	2,083,557 (29.5%)	1,165,636 (21.2%)
Northeast	44,476,403 (79.9%)	42,130,610 (85.5%)	2,345,793 (37.0%)	1,648,695 (46.7%)	292,896 (25.7%)	404,202 (24.1%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	133,497,473 (43.6%)	129,385,199 (52.1%)	4,112,274 (7.1%)	3,103,619 (10.7%)	668,010 (4.4%)	340,645 (2.5%)
Region						
West	41,389,111 (58.1%)	41,075,786 (66.7%)	313,325 (3.3%)	213,875 (4.2%)	60,405 (2.5%)	39,045 (1.8%)
Midwest	25,911,655 (38.4%)	24,871,197 (49.3%)	1,040,458 (6.1%)	768,508 (9.5%)	186,423 (4.2%)	85,527 (1.9%)
South	41,026,174 (36.7%)	38,639,434 (44.4%)	2,386,740 (9.6%)	1,820,619 (14.8%)	386,172 (5.5%)	179,949 (3.3%)
Northeast	25,170,533 (45.2%)	24,798,782 (50.3%)	371,751 (5.9%)	300,617 (8.5%)	35,010 (3.1%)	36,124 (2.2%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

CLINICAL/MEDICAL LABORATORY TECHNICIAN

Education Programs in Community Colleges

Community College Program Locations

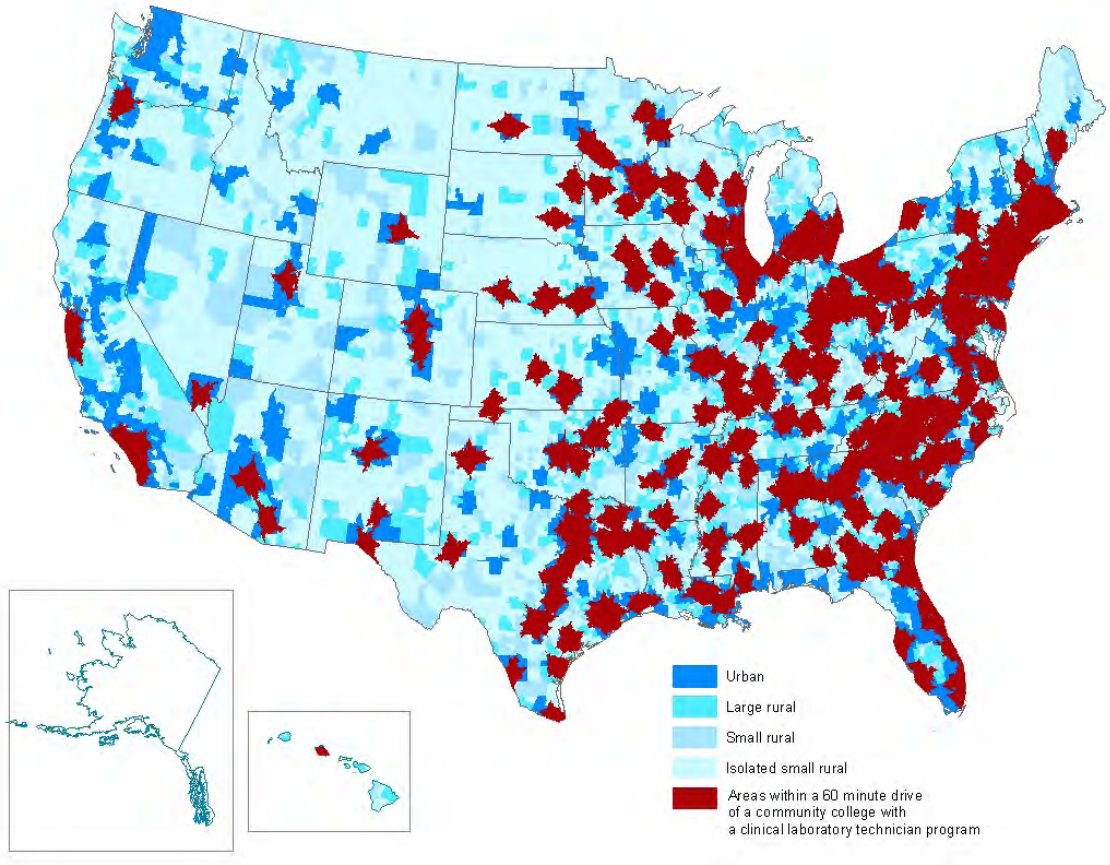
Trends in Community College Program Completions



Number of Community College Programs (2007-9)

U.S.	229	(100.0%)
Region		
West	19	(8.3%)
Midwest	62	(27.1%)
South	118	(51.5%)
Northeast	30	(13.1%)

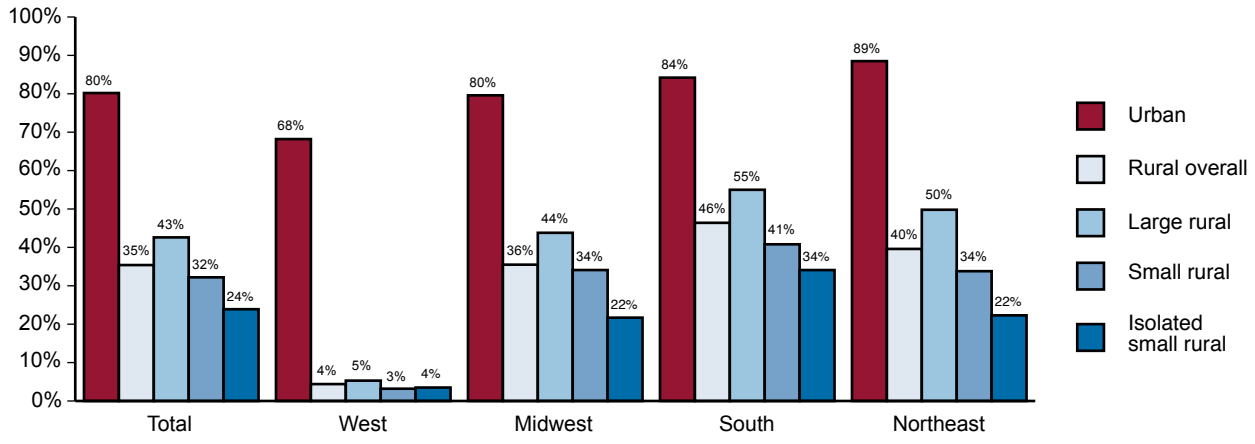
Areas Within a 60-Minute Drive of Community Colleges with Clinical/Medical Laboratory Technician Education Programs, in Relation to Rural and Urban Areas of the United States



Data source for education programs is the Integrated Postsecondary Education Data System (IPEDS), U.S. Department of Education. "Community colleges" include institutions classified by IPEDS as institutional categories 3 and 4. Education programs were those reported in 2007, 2008, and/or 2009 IPEDS. Rural/urban areas were determined using 2000 RUCA codes (census tracts), http://depts.washington.edu/uwruca/. Drive time was calculated using ESRI ArcGIS Network Analysis extension.

Clinical/Medical Laboratory Technician (continued)

Percent of Total 2007 U.S. Population in Rural and Urban Areas Within a 60-Minute Drive of a Community College with a Clinical/Medical Laboratory Technician Education Program



Number and Percent of U.S. Population in Rural and Urban Areas Within a 60- and 30-Minute Drive of a Community College Clinical/Medical Laboratory Technician Program

	Total	Urban	Rural			
			Overall	Large Rural	Small Rural	Isolated Small Rural
60-Minute Drive: Population Within a 60-Minute Drive of a Program						
U.S. overall	219,666,264 (71.7%)	199,138,540 (80.2%)	20,527,724 (35.4%)	12,375,203 (42.6%)	4,869,139 (32.2%)	3,283,382 (23.9%)
Region						
West	42,424,721 (59.6%)	42,003,013 (68.3%)	421,708 (4.4%)	270,193 (5.3%)	77,980 (3.2%)	73,535 (3.5%)
Midwest	46,235,714 (68.4%)	40,175,397 (79.6%)	6,060,317 (35.5%)	3,564,836 (43.8%)	1,527,240 (34.1%)	968,241 (21.7%)
South	84,851,248 (75.8%)	73,320,933 (84.2%)	11,530,315 (46.4%)	6,781,953 (55.0%)	2,879,724 (40.8%)	1,868,638 (34.1%)
Northeast	46,154,581 (83.0%)	43,639,197 (88.5%)	2,515,384 (39.6%)	1,758,221 (49.8%)	384,195 (33.8%)	372,968 (22.3%)
30-Minute Drive: Population Within a 30-Minute Drive of a Program						
U.S. overall	144,045,966 (47.0%)	139,210,262 (56.0%)	4,835,704 (8.3%)	3,634,805 (12.5%)	801,958 (5.3%)	398,941 (2.9%)
Region						
West	29,640,030 (41.6%)	29,571,282 (48.1%)	68,748 (0.7%)	44,567 (0.9%)	0 (0.0%)	24,181 (1.1%)
Midwest	29,012,273 (42.9%)	27,568,679 (54.6%)	1,443,594 (8.4%)	1,163,090 (14.3%)	198,344 (4.4%)	82,160 (1.8%)
South	52,462,807 (46.9%)	49,450,732 (56.8%)	3,012,075 (12.1%)	2,215,680 (18.0%)	529,720 (7.5%)	266,675 (4.9%)
Northeast	32,930,856 (59.2%)	32,619,569 (66.2%)	311,287 (4.9%)	211,468 (6.0%)	73,894 (6.5%)	25,925 (1.5%)
Overall 2007 U.S. Population Used for Calculating Percentages Above						
U.S. overall	306,291,398 (100.0%)	248,368,591 (81.1%)	57,922,807 (18.9%)	29,059,549 (9.5%)	15,110,073 (4.9%)	13,753,185 (4.5%)
Region						
West	71,223,932 (100.0%)	61,538,330 (86.4%)	9,632,945 (13.5%)	5,074,588 (7.1%)	2,436,670 (3.4%)	2,121,687 (3.0%)
Midwest	67,561,471 (100.0%)	50,475,215 (74.7%)	17,086,256 (25.3%)	8,131,767 (12.0%)	4,484,133 (6.6%)	4,470,356 (6.6%)
South	111,931,474 (100.0%)	87,068,766 (77.8%)	24,857,538 (22.2%)	12,320,246 (11.0%)	7,051,369 (6.3%)	5,485,923 (4.9%)
Northeast	55,631,348 (100.0%)	49,285,280 (88.6%)	6,346,068 (11.4%)	3,532,948 (6.5%)	1,137,901 (2.0%)	1,675,219 (3.0%)

APPENDIX C. NUMBER AND PERCENT OF SMALL RURAL HOSPITALS WITHIN A 60-MINUTE DRIVE TO ALLIED HEALTH EDUCATION PROGRAMS, BY CENSUS REGION

WEST REGION

	Number and Percent of Hospitals within a 60-Minute Drive to One or More Hospital-Relevant Allied Health Programs					
	All Small* Rural Hospitals		Critical Access Hospitals (CAHs)		Other Small* Rural Hospitals (Not CAHs)	
	n	%	n	%	n	%
All rural-relevant hospital occupations	104	30.7%	75	27.5%	29	43.9%
Individual occupations						
Surgical Technologist	40	11.8%	29	10.6%	11	16.7%
Health Information/Medical Records Technician	47	13.9%	32	11.7%	15	22.7%
Respiratory Therapist	34	10.0%	23	8.4%	11	16.7%
Clinical/Medical Laboratory Technician	12	3.5%	9	3.3%	3	4.5%
Pharmacy Technician/Assistant	61	18.0%	42	15.4%	19	28.8%
Physical Therapist Assistant	23	6.8%	18	6.6%	5	7.6%
Radiation Therapist	39	11.5%	28	10.3%	11	16.7%
Radiographer	34	10.0%	26	9.5%	8	12.1%
Diagnostic Medical Sonographer/Ultrasound Technician	14	4.1%	11	4.0%	3	4.5%
Occupational Therapist Assistant	14	4.1%	11	4.0%	3	4.5%
Nuclear Medical Technologist	5	1.5%	4	1.5%	1	1.5%
Cardiovascular Technologist	1	0.3%	1	0.4%	0	0.0%
Electrocardiograph Technician	2	0.6%	2	0.7%	0	0.0%

*Among allied health occupations most relevant to rural hospitals.

MIDWEST REGION

	Number and Percent of Hospitals within a 60-Minute Drive to One or More Hospital-Relevant Allied Health Programs					
	All Small* Rural Hospitals		Critical Access Hospitals (CAHs)		Other Small* Rural Hospitals (Not CAHs)	
	n	%	n	%	n	%
All rural-relevant hospital occupations	419	59.6%	373	58.9%	46	65.7%
Individual occupations						
Surgical Technologist	259	36.8%	227	35.9%	32	45.7%
Health Information/Medical Records Technician	232	33.0%	209	33.0%	23	32.9%
Respiratory Therapist	207	29.4%	182	28.8%	25	35.7%
Clinical/Medical Laboratory Technician	209	29.7%	190	30.0%	19	27.1%
Pharmacy Technician/Assistant	175	24.9%	160	25.3%	15	21.4%
Physical Therapist Assistant	176	25.0%	158	25.0%	18	25.7%
Radiation Therapist	181	25.7%	164	25.9%	17	24.3%
Radiographer	152	21.6%	131	20.7%	21	30.0%
Diagnostic Medical Sonographer/Ultrasound Technician	107	15.2%	99	15.6%	8	11.4%
Occupational Therapist Assistant	129	18.3%	109	17.2%	20	28.6%
Nuclear Medical Technologist	55	7.8%	52	8.2%	3	4.3%
Cardiovascular Technologist	40	5.7%	36	5.7%	4	5.7%
Electrocardiograph Technician	23	3.3%	21	3.3%	2	2.9%

*Among allied health occupations most relevant to rural hospitals.

SOUTH REGION

	Number and Percent of Hospitals within a 60-Minute Drive to One or More Hospital-Relevant Allied Health Programs					
	All Small* Rural Hospitals		Critical Access Hospitals (CAHs)		Other Small* Rural Hospitals (Not CAHs)	
	n	%	n	%	n	%
All rural-relevant hospital occupations	402	70.0%	231	68.3%	171	72.5%
Individual occupations						
Surgical Technologist	289	50.3%	166	49.1%	123	52.1%
Health Information/Medical Records Technician	222	38.7%	132	39.1%	90	38.1%
Respiratory Therapist	251	43.7%	144	42.6%	107	45.3%
Clinical/Medical Laboratory Technician	248	43.2%	152	45.0%	96	40.7%
Pharmacy Technician/Assistant	188	32.8%	117	34.6%	71	30.1%
Physical Therapist Assistant	198	34.5%	114	33.7%	84	35.6%
Radiation Therapist	173	30.1%	107	31.7%	66	28.0%
Radiographer	215	37.5%	124	36.7%	91	38.6%
Diagnostic Medical Sonographer/Ultrasound Technician	118	20.6%	75	22.2%	43	18.2%
Occupational Therapist Assistant	77	13.4%	46	13.6%	31	13.1%
Nuclear Medical Technologist	57	9.9%	36	10.7%	21	8.9%
Cardiovascular Technologist	48	8.4%	33	9.8%	15	6.4%
Electrocardiograph Technician	2	0.3%	2	0.6%	0	0.0%

*Among allied health occupations most relevant to rural hospitals.

NORTHEAST REGION

	Number and Percent of Hospitals within a 60-Minute Drive to One or More Hospital-Relevant Allied Health Programs					
	All Small* Rural Hospitals		Critical Access Hospitals (CAHs)		Other Small* Rural Hospitals (Not CAHs)	
	n	%	n	%	n	%
All rural-relevant hospital occupations	52	61.9%	37	56.9%	15	78.9%
Individual occupations						
Surgical Technologist	22	26.2%	13	20.0%	9	47.4%
Health Information/Medical Records Technician	27	32.1%	18	27.7%	9	47.4%
Respiratory Therapist	26	31.0%	17	26.2%	9	47.4%
Clinical/Medical Laboratory Technician	27	32.1 %	18	27.7%	9	47.4%
Pharmacy Technician/Assistant	12	14.3%	6	9.2%	6	31.6%
Physical Therapist Assistant	34	40.5 %	24	36.9%	10	52.6%
Radiation Therapist	24	28.6%	18	27.7%	6	31.6%
Radiographer	36	42.9%	24	36.9%	12	63.2%
Diagnostic Medical Sonographer/Ultrasound Technician	17	20.2%	11	16.9%	6	31.6%
Occupational Therapist Assistant	34	40.5%	21	32.3%	13	68.4%
Nuclear Medical Technologist	4	4.8%	1	1.5%	3	15.8%
Cardiovascular Technologist	9	10.7%	4	6.2%	5	26.3%
Electrocardiograph Technician	0	0.0%	0	0.0%	0	0.0%

*Among allied health occupations most relevant to rural hospitals.

APPENDIX D. TECHNICAL APPENDIX: METHODS—COMMUNITY COLLEGE EDUCATION PROGRAMS IN ALLIED HEALTH OCCUPATIONS

IDENTIFYING COMMUNITY COLLEGE ALLIED HEALTH PROGRAM COMPLETIONS

Using the National Center for Education Statistics' Classification of Instructional Programs (CIP), 2000 edition,[i] we selected the "Health Professions and Related Clinical Sciences" programs (and related professions) that did not require graduate degrees. With input from the Board of Directors of the National Network of Health Career Programs in Two Year Colleges, we identified 18 professions that were likely to be employed in rural communities throughout the United States and could be job-ready following completion of a community college education program. Some of the selected occupations could also be attained with higher degrees or through training in other settings.

We identified the community colleges in the United States offering each of the 18 selected allied health education programs using data contained in the Integrated Postsecondary Education Data System (IPEDS) from the U.S. Dept. of Education's National Center for Education Statistics.[ii] IPEDS includes education program data for almost all postsecondary education institutions in the United States, including community colleges and related institutions. To identify institutions offering each allied health program, we identified community colleges that showed students completing any of the selected program types within a three-year window (2007-2009). Many community colleges, especially in rural areas, are not able to offer each program every year because of small enrollments. By using a three-year window to identify allied health programs, we hoped to assure that our methods were as inclusive as possible. Program completion data through 2008 are shown in this report. IPEDS data do not become available until the academic year is complete, data have been submitted to the U.S. Department of Education, and they have been cleaned and posted by the host. At the time of these analyses, 2009 IPEDS data were not yet released.

The institutions defined as community colleges in this study were those whose institutional category was "degree-granting, not primarily baccalaureate or above" or "degree-granting, associate's and certificates" between 2007-2009 (n = 2,185). The U.S. Department of Education definitions of these institution types are:

3) Degree-granting, not primarily baccalaureate or above - These institutions offer a Bachelor's degree, Master's degree, Doctor's degree, or a First-professional degree. Also, the total number of degrees/certificates at or above the bachelor's level awarded divided by the total number of degrees/certificates awarded must be less than or equal to 50 percent.

4) Degree-granting, Associate's and certificates - Institutions offer an Associate's degree and may offer other postsecondary certificates, awards or diplomas of less than one academic year; at least one but less-than two academic years; at least two but less-than four academic years. This category also includes institutions that offer a postbaccalaureate certificate, Post-master's certificate or a First-professional certificate and the highest degree offered is an Associate's degree.[ii]

CALCULATING DRIVE TIME DISTANCES

Drive time analyses were conducted using ArcGIS (ESRI) desktop software. In order to calculate drive time distances, we obtained the addresses for the community college institutions from IPEDS and used a free online geocoding program to generate latitude and longitude coordinates for each institution. The coordinate information was imported into an ArcGIS personal database, and we created a point feature class that allowed us to plot the institution locations on a map.

Using the ArcGIS network analyst extension, we created 30- and 60-minute drive time service areas (polygons) around each of the 2,185 institutions we identified as community colleges throughout the United States (including Alaska and Hawaii). Drive time polygons were generalized, and created going outward (away) from the institution.

We identified all of the U.S. Census (2000) blockgroups within each institution's 30- and 60-minute service areas. Blockgroups are the smallest level of analysis for which detailed demographic census information is available. We defined a blockgroup as "within" the service area if the geographic centroid of the blockgroup intersected the service area. If the centroid of the blockgroup was not contained in the service area, we excluded the blockgroup. We used the ESRI feature class of census blockgroups to create a point feature class of all of the blockgroup geographic centroids in the United States. We then used the intersect analysis tool in the ArcGIS toolbox to create a point feature class of only the blockgroup centroids within the institution's service area, for all community colleges in the country.

IDENTIFYING SMALL RURAL HOSPITALS

For these analyses, we examined all rural hospitals with 49 or fewer beds, with a distinction between Critical Access Hospitals (CAHs) and non-CAH small rural hospitals. We obtained lists of hospitals meeting these criteria and their addresses from two sources. The Flex Monitoring Team maintains a list of all CAHs that is regularly updated from Centers for Medicare and Medicaid Services (CMS) Cost Reports and augmented by information provided by state Flex coordinators. This list was current as of March 30, 2010, and included 1,309 CAHs. Rural non-CAHs were extracted from a list of all hospitals with 49 or fewer beds purchased from the American Hospital Association in June 2010. The non-CAHs with ZIP codes in rural areas (identified using RUCAs) were selected for our analyses. This analysis examined all 1,700 small rural hospitals in total with separate analyses of 1,309 CAHs and 391 non-CAHs.

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