



## **Association of American Cancer Institutes 2010 Oncology Workforce Report**

Among cancer organizations, AACI is the only association dedicated explicitly to representing the interests of the nation's cancer centers, both NCI-designated and emerging centers. As the nexus of cancer research and patient care, AACI's members claim a unique perspective not only on blazing paths to the next frontiers of cancer interventions, but also on delivering these discoveries to patients.

In addition to setting the bar for high quality cancer care, control and investigation, cancer centers also serve as the training ground for the next generation of oncology workers—from researchers and physicians to oncology nurses, social workers, and other professionals dedicated to addressing the increasing burden of cancer.

With demand for cancer care growing, however, cancer centers face a significant challenge: More and older patients, many enjoying advances in cancer care that keep them living longer, are colliding with shortages in the oncology workforce.

### **CANCER CARE DEMAND AND THE LOOMING WORKFORCE BURDEN**

According to the Centers for Disease Control and Prevention, cancer kills more than half a million Americans each year, with more than 1.37 million diagnosed with cancer in 2006. It is the second leading cause of death in the United States, exceeded only by heart disease. In financial terms, cancer cost the United States an estimated \$228 billion in 2008, according to the National Institutes of Health.

The cancer care landscape becomes even more challenging when the high rate of cancer diagnoses and deaths are viewed against the backdrop of inescapable demographic trends. U.S. Census Bureau data show that the number of Americans 65 years and older will double between 2000 and 2030. As this wave of older citizens surges forward, 78 million people will move into the age group at highest risk for cancer. In addition, experts say that baby boomers have high expectations for medical care, and advances made in medical care contribute to the increasing demand for health care services.

A growing number of cancer survivors are also driving demand. According to the American Cancer Society, the five-year relative survival rate for all cancers diagnosed from 1999-2005 is 68 percent, up from 50 percent from 1975-1977. The improvement in survival reflects progress in diagnosing certain cancers at an earlier stage and improvements in treatment.

The expected difficulties that the oncology workforce will soon face in meeting demand for care has prompted AACI and other organizations in the cancer community to attempt to quantify the problem and develop solutions. Recent studies and surveys have found that:

- The number of health professionals currently certified in oncology won't be sufficient to handle the workload in 2020;
- Cancer patients won't necessarily be treated by oncologists – general practitioners must learn to treat cancer;

- There will be a shortage of qualified candidates for oncology residencies and fellowships.

Given AACI's role as the premier cancer center advocate, the association is well-positioned to address the impending workforce crisis. To that end, AACI launched the Oncology Workforce Initiative in 2008.

As an early step in the workforce initiative, AACI partnered with the Association of American Medical Colleges (AAMC) to sound out a representative group of eight cancer center leaders on their workforce concerns. Interviewed in October 2008, the group was also asked about best practices and mitigation strategies currently used by their centers to promote recruitment and retention of faculty and professional staff. AAMC's report on those interviews is available online at [http://www.aaci-cancer.org/in\\_oncologyworkforce.asp](http://www.aaci-cancer.org/in_oncologyworkforce.asp).

AACI's oncology workforce efforts are linked in part to its membership in the Institute of Medicine's (IOM) National Cancer Policy Forum (NCPF). AACI participated in a NCPF workshop that resulted in the publication of, "Ensuring Quality Cancer Care through the Oncology Workforce: Sustaining Care in the 21st Century". An article based on the workshop, co-authored by former AACI President Edward J. Benz, Jr., MD, President of Dana-Farber Cancer Institute, was published in January 2010, in the *Journal of Oncology Practice*.

The IOM report on the NCPF meeting identified some programs at medical institutions that address the workforce shortage:

- An initiative at the University of Utah to encourage more cancer nurses to participate in its nursing Ph.D. Program. Under the program, students can specialize in cancer prevention and control research through remote classes and on a part-time basis.
- Two programs at M.D. Anderson Cancer Center—an in-house education and training program for allied health care professionals such as laboratory technicians and radiology technicians, and an oncology post-graduate program for physician assistants;
- Dana-Farber Cancer Institute's effort to promote careers in oncology through its high school outreach program, whereby Dana-Farber faculty lecture in the high schools and students participate in field trips to the Center and in a summer research program.

Separately, current AACI President Michael A. Caligiuri, MD, has reported that his institution, The Ohio State University Comprehensive Cancer Center, has conducted a workshop on "Generation X's" diminished interest in careers in science and the health sciences, and how to address future challenges in recruiting faculty and post-graduate students.

AACI has also partnered with C-Change, an AACI Sustaining Member, and its "Cancer Core Competency" initiative. In December, 2009, AACI participated in a Cancer Workforce Development Forum hosted by C-Change, and in July 2010 the association participated in discussions for the launch of C-Change's collaborative efforts for "Sustaining a Strong National Cancer Workforce".

As a next step in the initiative, AACI has compiled this report, based on information submitted by 21 member centers about current programs, or those under consideration, aimed at enhancing oncology workforce training, recruitment and retention, as well as related areas of activity such as new models of care, research support, and policy. AACI is disseminating this report to help spread the use of management practices that support and expand the oncology workforce.

Reported workforce efforts ranged from wish lists to comprehensive program descriptions. For example, *Simmons Comprehensive Cancer Center at The University of Texas Southwestern Medical Center at Dallas* provided the following useful round-up of “goals and tactics”:

1. Maintain and expand oncology nursing education and certification, both on campus and with affiliated clinics;
2. Expand use of physician extenders, nurse practitioners and advanced practice nurses in cancer clinics;
3. Explore creative ways to address need to expand our oncology supportive care professional (e.g., social workers, dietitians, counselors, physical therapists), particularly as regards survivorship needs;
4. Continue to focus on recruiting top-rate oncology physicians, particularly those experienced and interested in clinical research; and,
5. Maintain links with undergraduate and graduate nursing programs in our cancer clinics as a way to encourage more nurses to pursue opportunities in oncology.

Meanwhile, some AACI members elaborated on an array of established programs aimed at supporting and expanding the oncology workforce. Survey responses from University of Texas MD Anderson Cancer Center, The Siteman Cancer Center of Barnes-Jewish Hospital at Washington University School of Medicine, and UCI Chao Family Comprehensive Cancer Center are detailed below under the heading, “A Closer Look”.

## RECRUITMENT AND RETENTION

*Lombardi Comprehensive Cancer Center at Georgetown University* is in a unique location (Washington, D.C.) that has enabled it to experience exceptional growth. In addition to location, Lombardi offers the opportunity for a faculty appointment at Georgetown University, close proximity to the National Cancer Institute, and a clinical partnership (MedStar Health) with nine hospitals in the Washington-Baltimore corridor with annual operating revenues of \$3.8 billion, creating an attractive market for responding to the workforce shortage.

Several other factors have positioned Lombardi well in terms of responding to projected shortages, including:

- University benefits including tenure;
- Flexible career paths - Due to the large number of clinical activities in the same geographic area, generated in part by expansion into suburban areas, clinical oncologists have the opportunity to move from a more robust academic focus to a more clinically focused practice, or vice versa;
- Supportive models that include hospitalists, palliative care, and patient navigators - Expansion in these areas has improved the attractiveness of clinical oncology positions by reducing some of the more intensive patient care burden and personal time commitments; particularly for those who have a busy home life;
- An extensive Cancer Center employee morale building program called, “Caring for the Caregivers” - This cancer care program, supported by philanthropic funds, provides a wealth of supportive programs to improve employee morale and job satisfaction for caregivers including clinical oncologists;
- Infrastructure that supports patient care, teaching, research and community outreach - The university and clinical partner provide several reciprocal services that help clinical oncologists to excel in their efforts to provide exceptional patient care, teaching, research and community outreach; and,
- An environment that promotes “service to others” as a part of its mission - Many employees from all areas are attracted to institutions by the inherent mission, vision, values of an organization. Lombardi believes that clinical oncologists will gravitate toward organizations that support their personal values.

The *Winship Cancer Institute of Emory University*, in Atlanta, Georgia maintains a clinical affiliation with the Grady School of Radiation Therapy Technology in order to ensure a pipeline for radiation therapists. In addition, they provide seed grant funding for junior faculty and trainees. In the area of retention, Winship has established an Academic Development Committee that emphasizes mentorship of junior faculty, including grant reviews, along with an Academic Development Seminar consisting of both scientific and non-scientific presentations to assist faculty in work-life balance.

*St. Jude's Children's Research Hospital*, in Memphis, Tennessee provides assistance in recruiting postdoctoral candidates and conducts the Pediatric Oncology Education (POE) program (<http://www.stjude.org/poe>), funded by the National Institutes of Health / National Cancer Institute. The POE program offers a unique opportunity for students preparing for careers in the biomedical sciences, medicine, nursing, pharmacy, psychology, or public health to gain biomedical and oncology research experience. The POE program provides a short-term training experience (internship) in either laboratory research or clinical research.

A primary goal of the program is to encourage students to pursue a career in cancer research, either as a laboratory-based scientist or a physician scientist. Thus, qualified students with an interest in cancer research are particularly encouraged to apply.

The Office of Community Outreach at the *University of New Mexico Cancer Center* is addressing the oncology workforce shortage through varied community outreach educational and service programs. Through both the NCI CA 101 educational program and the NCI Community Clinical Trials Education Program (both of which have been adapted for Hispanic and Native American communities), participants are exposed to the importance of scientific research and clinical trials and young people are encouraged to pursue careers in science and health care. By creating a strong connection between the community and the Cancer Center, the Office of Community Outreach provides support and encouragement for the oncology workforce that is involved in community outreach, thereby enabling high levels of retention of oncology workers recruited from the communities.

The *University of Colorado Cancer Center* offers high school/college summer research programs, while the George Washington University Cancer Institute operates MORE (Minority Oncology Research and Education), a program for recruiting Washington, D.C. metro area minority students in high school, college and graduate school into cancer-related biomedical education.

Similarly, in partnership with the Southern Nevada Workforce Investment Board and the College of Southern Nevada, the *Nevada Cancer Institute* (NVCi) recently received federal funding for the "Plus One Program", an employment transition program for high demand healthcare workers in Las Vegas. The program expects to enroll 24 nurses and 84 allied healthcare workers in order to prepare them to earn industry-recognized certificates in providing cancer-specific care or cancer laboratory research.

NVCi also partners annually with Siemens AG to offer the Siemens Oncology Scholarship Program, which aims to increase the number of Nevada students focusing on oncology nursing, basic sciences, biotechnology or public health.

Also of interest to students, an NVCi principal investigator has received a federal supplement to address the growing need to understand the genetic complexity and cellular signaling heterogeneity of melanoma as treatments. The supplement includes support for undergraduate students and community college faculty who will ultimately gain valuable research experience as they perform experiments designed to determine the requirements for tumor formation.

The 2009 Robert S. and Dorothy J. Keyser Foundation High School Internship Program, based at NVCI, closely collaborated with the Clark County School District to create an intellectually challenging environment for students pursuing careers primarily in medicine, healthcare and biotechnology. The program provided access to NVCI faculty and staff, state-of-the-art medical and research facilities, discussions groups, laboratory or other work experience with a preceptor scientist, clinician, or other professionals, and attendance at seminars delivered in a medical and scientific format.

NVCI also housed the 2009 Keyser Foundation Summer Science Program, a seminar-style, two-week program that included presentations by NVCI clinicians and researchers, and hands-on laboratory experiments. It provided education and enrichment opportunities for high school students who demonstrated an interest in a career in science or healthcare. The curriculum focused on cancer education and prevention, applied science and health career exploration.

Retention of critical faculty and staff in the field of cancer medicine and research is a major initiative at the *Sidney Kimmel Comprehensive Cancer Center (SKCCC) at John Hopkins University*, in Baltimore, Maryland. Significant adjustments in faculty compensation have been made in both base salaries as well as the implementation of a new performance-based faculty salary supplement system. In addition, SKCCC has improved start-up packages for new faculty recruits and continues to implement market adjustments at all non-faculty clinical and other critical staff positions.

*Arizona Cancer Center* is seeking donors for research on specifically target disease sites to help keep oncologists at the cancer center who are likely to be recruited elsewhere. In addition, Arizona received a major gift in 2010 that enabled the establishment of three new endowed chairs, plus two new endowments for faculty. Arizona is expanding its statewide network of affiliates, partly to reduce the workload for existing faculty, and partly to acquaint affiliates with the Center's academic and research mission.

## **RECRUITMENT AND RETENTION – A CLOSER LOOK**

### **UCI Chao Family Comprehensive Cancer Center**

Oncology professional workforce recruitment at the *UCI Chao Family Comprehensive Cancer Center (CFCCC)* emphasizes academic partnerships and multidisciplinary teams. Access to translational medicine, utilizing research to provide patients with the newest therapies/treatments and cutting-edge comprehensive health care, is an effective recruitment advantage. The School of Medicine and the CFCCC provide educational opportunities and training to enhance job satisfaction.

CFCCC's policy clearly defines organizational values of academic achievement, respect, integrity, service and excellence. Oncology healthcare professionals are attracted to the ideals of intellectual identity and lifelong learning, and enjoy professional growth.

Improving workplace conditions and enhancing education and professional development opportunities are also critical to minimizing the impact of the projected shortage. CFCCC and UCI Administration support and maintain these programs.

Ongoing efforts include:

- Sponsoring clinical research staff who qualify (years of service in an applicable field) for training, membership, and certification in The Society of Clinical Research Associates;
- Providing clinical research staff opportunities for promotion, based on experience, certification, performance, etc.;
- Establishing a program for students of community colleges to serve as interns at the CFCCC for hands on experience and training;

- Collaborating with UCI's extension program to allow Clinical Research Certification Series students to intern at the CFCCC for hands-on experience and training;
- Providing release time and funding for senior managers to attend national conferences for continuing professional education in their field;
- Requiring senior managers and others to formally present information/ideas from national conferences to others at CFCCC upon their return; and,
- Providing in-service training and education to nursing staff and clinical research staff showcasing specific trials, research challenges and solutions, fostering awareness of clinical research and accrual to clinical trials.

## ONCOLOGY WORKFORCE TRAINING

As noted by Edward J. Benz Jr., MD, in remarks delivered during an Institute of Medicine National Cancer Policy Forum workshop on the oncology workforce, cancer centers are at a unique advantage to offer innovative training and education programs both directly and indirectly, through the hospitals, office, and other affiliates of the centers. (Institute of Medicine. 2009. *Ensuring Quality Cancer Care Through the Oncology Workforce: Sustaining Research and Care in the 21st Century: Workshop Summary*. Washington, DC: The National Academies Press). As illustrated below, a number of AACI members are leveraging that advantage to enhance cancer expertise and improve care for cancer patients.

*Huntsman Cancer Institute* (HCI), in Salt Lake City, doubled its fellowship program from two to four fellows per year several years ago. The expansion came in anticipation of the increased need and increased training opportunities of HCI. While it proceeded without solid financial resources, expectations were high for its success and agreements are now in place with University of Utah Health Sciences to help fund some of these efforts.

*Winship Cancer Institute* operates fellowship programs in Hematology and Medical Oncology (15 fellows enrolled; recently received 5 year accreditation) and in surgical oncology for breast surgery. Winship has also placed a request to increase the number of slots from 12-16, based on volumes, in its radiation oncology residency program, and it offers a joint master's degree program in medical physics with the Georgia Institute of Technology.

Dartmouth Medical School (DMS) increased its 2010 enrolling class from 84 to 90 students. *Norris Cotton Cancer Center (NCCC)* has a proposal pending with DMS to establish a fellow training program within its section of Radiation Oncology. In addition, the existing Hematology/Medical Oncology Fellow program at NCCC has submitted a T32 proposal to train Medical Oncology Fellows in clinical and translational research. These three initiatives should contribute to NCCC's efforts to train additional physicians, recruit them into Radiation Oncology, and retain them in Medical Oncology academic practice.

*Fred Hutchinson Cancer Research Center* and The Seattle Cancer Care Alliance oversee fellowship and training programs that attract domestic and international physicians interested in research and specialty care training. About 200 physicians participate in the programs, which offer opportunities for recruitment into academic practices.

The Medical Scientist Training Program, operated by the *Robert H. Lurie Comprehensive Cancer Center of Northwestern University*, is a premier biomedical research program that has trained more than 220 MD/PhD physician-scientists for careers in academic medicine, government and the biotechnology-pharmaceutical industry. The program targets the growing demand for physician-scientists, who will play an increasingly important role in basic biomedical discovery and in translating these discoveries into new diagnostics and therapeutics for human disease.

Clinical-based workforce initiatives at *St. Jude's Children's Research Hospital*, in Memphis, Tennessee ([http://home.web.stjude.org/academic\\_Prog/](http://home.web.stjude.org/academic_Prog/)) include hosting fourth-year medical students from across the country for clinical electives and/or research projects, pediatric residents from pediatric programs outside Memphis for rotations at St. Jude, clinical observers for rotations, and clinical shadowing.

At the *University of Colorado Cancer Center*, TACTIC (for survivors of childhood cancers) and THRIVE (for survivors of adult cancers) are multi-disciplinary clinics run by the internal medicine department in collaboration with the oncology department. The programs educate primary care physicians about cancer patients' long-term health issues and how best to address them. Colorado also houses a Lance Armstrong Foundation Center of Excellence, which includes education and training for internists.

*Arizona Cancer Center* is actively seeking new grant funding for training programs for oncologists, as well as institutional level support for training grants and providing classes related to research and time management for hands-on training of our junior oncology faculty. Arizona involves junior faculty in committees and workshops, in the belief that the more involved new faculty are the more likely they will be to continue their training. Arizona has also received several specific restricted gifts which are dedicated to supporting fellowships in oncology. Also, within the last two years Arizona has developed a rigorous and tightly managed mentoring program at the Center level, to augment mentoring done at within academic departments.

*Nevada Cancer Institute* and the University of Nevada School of Medicine interviewed 17 applicants in 2010 for its first Medical Oncology Fellowship training program in Las Vegas. The inpatient component of the program includes a combination of inpatient management and consultation services. In conjunction with an attending physician, the fellows actively participate in the care of inpatients, ranging from disease diagnosis to clinical management, including the administration of antineoplastic treatments. Fellows will also gain outpatient clinical experience at the University Medical Center and Nevada Cancer Institute outpatient oncology clinic.

The Dana-Farber/Partners CancerCare training program in hematology/oncology represents a merger of three previously independent programs in the two subspecialties at the *Dana-Farber Cancer Institute* (DFCI), Brigham and Women's Hospital (BWH), and the Massachusetts General Hospital (MGH). The goal of the program is to develop academically oriented physicians who will become future leaders in clinical and laboratory investigation and clinical teaching. The program offers the opportunity for training in only hematology or oncology, but it is anticipated that the vast majority of fellows will elect to train in both subspecialties as defined in the 36-month program by the American Board of Internal Medicine. The program is structured to include an initial year of intensive clinical training followed by two or more years of in-depth clinical and/or basic research training during which time an additional six months of clinical experience may be obtained.

During the first year of training, the ambulatory hematology and oncology experience of the fellows is organized primarily around disease-specific programs (i.e. hematologic malignancies, gastrointestinal cancer, thoracic oncology, women's cancer, benign hematology, etc.). Fellows acquire a panel of patients for whom they provide longitudinal, primary care in oncology and hematology. Each of these patients is managed under the direct supervision of a faculty member.

At the beginning of the second training year, fellows are expected to enter an investigative program to begin a period of detailed training and research which will, hopefully, culminate and each candidate assuming her/his own independent research program in a respected academic institution.

*Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins University* fosters training and education in multiple ways, including participation in graduate programs, training grants, and a variety of didactic lectures and named-lectureships, seminars, formal courses, and scientific meetings. There are postdoctoral training programs in basic and clinical research, cancer prevention and control, and specialty training in the various

oncology disciplines. A major participant in 11 NCI training grants, SKCCC counted 178 post-doctoral fellows and 63 graduate students in the 2009-2010 academic year.

For more than three decades, a spring semester Cancer Biology course has alternated with a New Approaches to Cancer Prevention and Therapy Course. A new course launched in 2010—"Fundamentals of Cancer: Cause to Cure"—is intended for laboratory PhD/postdoctoral trainees and clinical fellowship/radiation oncology residents. The course is designed to be highly translational, and serve as a foundation for those interested in further training.

A combined Medical Oncology and Hematology program offers the option of training in either single specialty or training for dual certification. Each first year class counts 10 positions (eight in medical oncology and two in hematology--an overall increase of two slots over the last five years). An expansion of the program by two additional fellows over the next five years is under consideration, along with an exchange program with a London hospital to expose fellows to other care models.

Through a program entitled "Research Training in Neuro-Oncology," SKCCC prepares neurosurgeons, radiation therapists, medical and pediatric oncologists, and neurologists for academic careers in neuro-oncology. In addition, seven fellows are selected each year to train in the Johns Hopkins University/National Cancer Institute Pediatric Hematology/Oncology Fellowship Training Program, a three-year program providing clinical and research exposure to develop subspecialist academicians adept in laboratory and/or clinical research, coupled with superior patient management skills.

Along with the portion of the oncology workforce that delivers hands on care, attention is also being focused on cancer center administrator training. *George Washington Cancer Institute* has launched its Center for the Advancement of Cancer Survivorship, Navigation and Policy (caSNP). The Center includes a Cancer Health Policy Scholars program, a 3-day intensive immersion program that includes workforce issues. It also conducts executive training for **mid-level health care administrators** to provide them with tools for increasing their patient-centered focus in cancer treatment and survivorship. The information includes models for more fully integrating **oncology nurse practitioners** (NPs) into oncology practice.

## **ONCOLOGY WORKFORCE TRAINING – A CLOSER LOOK**

### **The Siteman Cancer Center of Barnes-Jewish Hospital at Washington University School of Medicine**

The Cancer Biology Pathway and Molecular Oncology Training Program at *The Siteman Cancer Center of Barnes-Jewish Hospital at Washington University School of Medicine*, in St. Louis, Missouri are designed to train graduate and postgraduate students in interdisciplinary research relevant to cancer biology. The goal of the program is to provide basic scientists with in-depth training in diverse aspects of basic, translational, and clinical cancer research, and to foster the development of interdisciplinary collaborative undertakings. Thus, the program is devoted entirely to training students in the PhD program or postdoctoral fellows with a PhD, not those training for, or who have received, MD or MD/PhD degrees who have other sources of support at Siteman and other avenues of obtaining a background in broad issues of cancer biology.

The program was initiated at Washington University with institutional funds in 2002 as a training mechanism for graduate students. The program was expanded to include postdoctoral students, with funding of the current application. The program has been interdisciplinary since its inception with students and postdoctoral fellows participating in cancer research in a wide range of fields in multiple different departments. To date, about 40 pre-doctoral and 10 post-doctoral trainees have participated.

The Siteman Summer Opportunities Program began in 2000 to provide a 10-week intensive cancer research training experience and to help create future generations of cancer researchers. This program provides opportunities for undergraduate, pre-med and medical students enrolled at Washington



University or other accredited universities to work on cancer research projects with Siteman Cancer Center research members. Opportunities range from basic laboratory research to clinical research to prevention/control and population research. The program has grown to at least 12 participants per year selected from hundreds of applicants. More than 120 students have taken part to date.

Since 2002, 41 fellows have participated in Siteman's Hematology-Oncology Fellowship Protocol Program. The program provides fellows with assistance in development, initiation, and conduct of a clinical study in hematology, oncology, or hematopoietic stem cell transplantation. Each fellow must develop a clinical investigation (i.e. human) study, which may or may not be a therapy-related study. Fellows may elect to initiate a new study or continue work on a study started by a previous fellow. Fellows are urged to strongly consider correlative science for these clinical trials and to use the scientific expertise at the Siteman Cancer Center Core laboratories. Fellows receive one month of elective time during their first year to develop the protocol. As part of the program, each fellow must also seek external funding for the study with his or her faculty mentor.

Siteman mentorship programs include Disease-focused Research Working Groups and Pilot Awards for Junior Faculty. Each of Siteman's research working groups (Lung, GI, GU, Neuro, and Gynecologic) and translational research programs (Hematopoietic Development & Malignancy, Translational & Clinical Research, Breast Cancer) has a mentorship program. These frequently take the form of a competitive application process. In addition, developmental research pilot awards targeting junior investigators require mentorship plans in order to be considered for funding.

## NURSING AND ONCOLOGY

Nursing is the largest health care profession in the United States, and nurses have been termed "the heartbeat of healthcare". According to the National Council of State Boards of Nursing, there were nearly 3.4 million licensed registered nurses (RNs) in 2006. Approximately 59 percent of RN jobs are in hospitals. It is estimated that by 2020 the national nurse shortage will increase to more than 1 million full-time nurse positions.

The projected nursing shortage is driven by many factors: a narrowing pipeline of new students to nursing; a decline in registered nurse earnings relative to other available career opportunities; a lack of faculty available to train the next generation of nurses; diminished interest in careers in science and the health sciences among younger people; and, an aging nursing workforce.

According to a report by the American Association of Colleges of Nursing, (see *2009-2010 Enrollment and Graduations in Baccalaureate and Graduate Programs in Nursing*, American Association of Colleges of Nursing), U.S. nursing schools turned away 54,991 qualified applicants from baccalaureate and graduate nursing programs in 2009 due to an insufficient number of faculty, clinical sites, classroom space, clinical preceptors, and budget constraints. Almost two-thirds of the nursing schools responding to the survey pointed to faculty shortages as a reason for not accepting all qualified applicants into entry-level baccalaureate programs.

In another report, a total of 803 faculty vacancies were identified in a 2009 survey of nursing schools (see *Special Survey on Vacant Faculty Positions, August 2009*, American Association of Colleges of Nursing) with baccalaureate and/or graduate programs across the country. Besides the vacancies, schools cited the need to create an additional 279 faculty positions to accommodate student demand.

The impact of a nursing shortage on oncology patients spans the continuum of care--from prevention and early detection through treatment and survivorship. Oncology nurses not only administer life-saving chemotherapy and supportive care drugs, but also educate patients and help them cope with the physical and emotional toll of cancer and its treatment.

On the clinical and research side, oncology nurses have contributed to a large body of literature on topics such as symptom and side effect management, psychosocial and behavioral issues, and health promotion in practice settings. The multidisciplinary approach to high-quality cancer care would be difficult to sustain without nursing clinicians, educators, administrators, and scientists.

*UCI Chao Family Comprehensive Cancer Center* reports that the University of California, Irvine Medical Center's recruitment of the nursing workforce emphasizes academic partnerships and multidisciplinary teams. Access to translational medicine – utilizing research to provide patients the newest therapies/treatments and cutting-edge comprehensive health care—is effective in the recruitment of nurses. The Schools of Medicine and Nursing provide educational opportunities, training and enhance professional job satisfaction.

UCI's policy clearly defines organizational values of academic achievement, respect, integrity, service and excellence. Nurses who are attracted to lifelong learning enjoy professional growth. Between 1997 and 2001, UCI participated in the California Strategic Planning Committee for Nursing (CSPCN). UCI established and expanded formal nursing education services. The clinical nurse educator program is an example of an innovative educational program preparing nurses with the basic skills and knowledge to effectively serve as Clinical Instructors.

Nursing recruitment and retention is enhanced through financial compensation for obtaining certifications in areas of clinical specialty. Academic counseling and assistance with a wide array of services are made available to UCI nurses as part of our recruitment and retention efforts.

Improving workplace conditions and enhancing the education and professional development of nurses are necessary to minimize the impact of the projected nursing shortage. To that end, the California legislature enacted a law mandating patient-to-nurse ratios for its hospitals. UCI Administration supports and maintains these care delivery parameters that help ensure safe care and job satisfaction.

*University of Texas M. D. Anderson Cancer Center's* Nursing Workforce Development Department offers a range of programs designed to develop and retain a pipeline of well-prepared staff members. Programs include the: (1) Nursing Cohort Program to support the academic advancement of staff seeking an initial or advanced nursing degree; (2) Certified Nursing Assistant Cohort to support the advancement of entry level employees to entry level nursing certification; (3) "Launch into Nursing" New Graduate Nurse Residency Program to enable recent graduates to transition through a comprehensive program into the role of registered nurse in an advanced oncology setting; (4) Outreach to educate community elementary, middle, and high school youth about careers in nursing; (5) Nursing Student Clinical Placement at M. D. Anderson for graduate, undergraduate and high school students through academic affiliation agreements; (6) Professional Student Nurse Extern program to allow nursing students to work in M. D. Anderson's Magnet Recognized facility; and (7) Rising Stars leadership development program for high performing, direct care nursing clinicians. M. D. Anderson has also created an academic department for faculty nurses to further enhance nursing research and education.

Nursing outreach at M.D. Anderson includes the outreach described above plus the following: (1) Professional Education for Prevention and Early Detection program to offer two-four day courses to enable health care professionals to return to their home communities better prepared to educate patients and their families about cancer prevention; (2) Post Graduate Fellowship in Oncology Nursing to promote expertise in cancer care at the advanced practice nurse level through a year-long curriculum and a post master's certificate in oncology nursing; (3) Texas Cancer Council/Cancer Prevention Research Institute of Texas grant program to allow training in female cancer screening for nurses and advanced practice nurses working in rural or medically underserved communities in Texas (over 1,500 trained in the last seven years impacting over 120,000 Texas women); and (4) Nursing Education Outreach through our Nursing Extramural Programs in providing annual education activities ranging from oncology nursing

symposia, accredited continuing nursing education events, mobile outreach education, nurse visitor programs, and other accredited programs to enhance the oncology education of nurses and nurse faculty outside of M. D. Anderson.

At *Huntsman Cancer Institute* (HCI), 30 registered nurses who have completed its Oncology Nursing Internship Program have been successfully retained over the past two and a half years. The most recent class drew from applicants from across the country competing for six positions. Huntsman is the only facility in the country that provides such an advanced level of training for new nurses. Program graduates are now moving into leadership roles at Huntsman and are applying for outpatient positions.

A Nursing Strategic Plan that includes supporting professional development and mentoring of young staff. Professional support includes encouragement, covering costs when staff members complete courses, and recognizing advanced oncology certification for RN staff. HCI's Director of Nursing also supports one or two individuals a year in school for advanced degrees.

As stated in HCI's report to AACI, "Nursing leadership at Huntsman works hard to maintain a very engaged workforce that sees the 'big picture' at the Institute, not just their own area." Huntsman nursing staff has access to an internal website that provides a central nursing site calendar of events. Each nursing area has a Clinical Practice Council chaired by staff nurses that is responsible for maintaining a high level of quality meeting national standards of practice.

Although nursing at HCI currently has a very low turnover and boasts a waiting list for job openings, Huntsman's Director of Nursing delivers lectures at all the local nursing schools, highlighting possibilities for oncology nursing careers. Nursing leadership has also noted strong support for nursing staff at the executive level of Huntsman Cancer Institute as a significant benefit.

In Atlanta, *Winship Cancer Institute* sponsors the annual Winship Cancer Institute Symposium for Oncology Nurses. It also offers preceptorships for nursing and nurse practitioner students to help familiarize them with oncology, and it provides supplemental pay of \$1000 per year for oncology nurse certifications.

*Fred Hutchinson Cancer Research Center* and The Seattle Cancer Care Alliance employ nurse practitioners and physician assistants and are currently exploring the development of oncology training programs within existing physician assistant schools and programs to increase early recruitment in academic medicine and other programs. Nurse practitioners manage some clinics for the institutions, such as the survivor and wellness clinics. Follow up visits can be performed thoroughly with these resources, while allowing additional time for physicians to see more seriously ill patients. Similarly, the Breast Center and other clinics at the *University of Colorado Cancer Center* are training its nurse practitioners to assume some of the long term care of patients.

The *Sidney Kimmel Comprehensive Cancer Center (SKCCC) at Johns Hopkins* workforce strategy focuses on the retention of oncology nurses, and includes an innovative program designed to enhance nurses' resiliency and decrease the burden of professional bereavement and burnout. Additionally, a 12 month internship-style program, coupled with additional education and training, is directed toward retaining the newly graduated professional oncology nurse. Recruitment activities include clinical rotations for area nursing students, leadership experiences for graduate students, and summer clinical nurse extern programs.

## **ONCOLOGY WORKFORCE DEVELOPMENT STRATEGY – A CLOSER LOOK**

### **University of Texas M. D. Anderson Cancer Center**

*University of Texas M. D. Anderson Cancer Center* has developed a variety of approaches to help minimize the impact of projected oncology workforce shortages. These range from internal training and education programs for current and potential employees, to community outreach programs to encourage interest in health professions careers, to strategic planning programs. M. D. Anderson also has a number of efforts underway to provide a high quality working environment with attention to both intrinsic and extrinsic drivers of faculty and employee satisfaction and retention. These efforts include extensive faculty development and health and communication skills programs that have been in existence for more than ten years to provide continued professional and personal development for faculty members at every stage of their careers.

Internal training programs are broad in scope. Included are tuition assistance programs for employees wishing to obtain further education in areas related to M. D. Anderson's workforce needs, extensive workforce development and retention programs through an online education center and face-to-face training, large training programs for postdoctoral research fellows and clinical residents and fellows, and physician assistant and nursing development and training programs.

Examples of the physician assistant (PA) programs include providing rotation and elective sites for undergraduate PA programs and offering a PA postgraduate program in oncology. Both of these programs support affiliated institutions training programs and result in increased interest in oncology and significant recruitment from those programs into a large population of oncology physician assistants.

Internal education programs include certificate and degree-granting programs in eight allied health professions fields including Clinical Laboratory Science, Cytogenic Technology, Cytotechnology, Diagnostic Imaging, Histotechnology, Medical Dosimetry, Molecular Genetic Technology, and Radiation Therapy (also taught via distance education at other clinical sites).

In response to extreme workforce shortage projections for allied health fields, M. D. Anderson has invested significant resources in building new education facilities for its School of Health Professions, and tripling enrollment in this undergraduate school over the past three years. M. D. Anderson hires about 50 percent of the graduates of this program, with most of the remainder hired within the State of Texas.

Community outreach programs to encourage interest in health careers and to provide oncology training to other health professionals are also broad in scope at M. D. Anderson. These efforts range from nursing-related and family medicine programs to online educational materials, outreach into local schools and on-site summer programs for high school students and teachers.

M. D. Anderson's Nursing Workforce Development Department offers a range of programs designed to develop and retain a pipeline of well-prepared staff members. (See the "Nursing and Oncology" section of this report for more information.)

M. D. Anderson is enhancing its online educational materials through its Professional Oncology Education Initiative. Current programs include training in general oncology principles for physician assistants and nurses and family practitioners, and allied health education. Developing programs include survivorship and other priority topics in oncology and cancer biology.

Outreach programs to students and teachers are diverse. These include outreach programs into community high schools and formal summer research programs for high school students and high school science teachers, college undergraduates and freshman medical students. The summer programs bring

hundreds of students to M. D. Anderson to develop their interest in biomedical careers and oncology, and provide training and teaching materials to high school science teachers to improve their science teaching skills and networks with leaders of advanced educational programs. These programs are supported by endowments, state and federal grants awarded to M. D. Anderson, and faculty research grants. Tracking of the graduates shows increased retention in schools and progression into colleges and biomedical careers.

## CONCLUSION

In its latest strategic plan, The U.S. Department of Health and Human Services lists a number of “external risk factors” that stand in the way of achieving the broad goals of the U.S. health care system: changing demographics in the population and in the health, public health, and human services workforce; increased demand for services; and difficult fiscal conditions at the state and local levels. Add in the specific challenges facing the oncology workforce, such as longer periods of both intensive and less-intensive follow-up care, and, in particular, fewer people becoming oncology caregivers and researchers for shorter periods of time, and the national goal of eradicating cancer can sometimes seem unattainable.

Clearly, a transdisciplinary approach is needed to ensure that the oncology workforce remains strong in the face of such varied obstacles. Increasing supply or disseminating knowledge in only one segment of this enterprise is insufficient. As suggested by former AACI President Dr. Edward J. Benz, Jr., a broad, three-pronged framework, supported by the nation’s cancer centers, could be the key to stabilizing the oncology workforce.

The first pillar, involving recruitment and retention, would require maximizing the pipeline of people who possess true expertise in cancer care, including nurses, psychosocial counselors, and other caregivers who think of themselves as cancer specialists.

The second pillar would acknowledge that even great success with the first pillar isn’t likely to be enough if the number of fairly long-term cancer survivors—about 12 million people now—continues to go up. So we need to expand the scope of oncology training by increasing core competencies—the minimum level of knowledge—of oncology in all disciplines.

The third pillar would encompass interventions that would increase health care consumers’ overall oncology expertise. Such efforts would be led by oncology workers engaged in public policy, patient advocates and public officials.

As illustrated by the case studies and best practices contained in this report, AACI’s member centers are making major strides in addressing gaps in the recruitment, retention and training of the oncology workforce, and in the dissemination of cancer knowledge. Such efforts will help to ensure that the very best possible care will be extended to all cancer patients now, and for many years to come.

**CENTERS PARTICIPATING IN THE SURVEY (alphabetically by state)**

Arizona Cancer Center  
The University of Arizona College of Medicine  
Tucson, Arizona

UCI Chao Family Comprehensive Cancer Center  
Orange, California

University of Colorado Cancer Center  
Aurora, Colorado

The George Washington University Cancer Institute  
Washington, D.C.

Lombardi Cancer Center at Georgetown University  
Washington, D.C.

Winship Cancer Institute of Emory University  
Atlanta, Georgia

Sidney Kimmel Comprehensive Cancer Center at  
John Hopkins University  
Baltimore, Maryland

Dana-Faber Cancer Institute  
Harvard School of Medicine  
Boston, Massachusetts

The Siteman Cancer Center of Barnes-Jewish  
Hospital at Washington University School of  
Medicine  
St. Louis, Missouri

Roswell Park Cancer Institute  
Buffalo, New York

Nevada Cancer Institute  
Las Vegas, Nevada

Norris Cotton Cancer Center Dartmouth Medical  
Center  
Dartmouth-Hitchcock Medical Center  
Lebanon, New Hampshire

The Robert H. Lurie Comprehensive Cancer Center  
of Northwestern University  
Chicago, Illinois

Holden Comprehensive Cancer Center  
University of Iowa  
Iowa City, Iowa

University of New Mexico Cancer Center  
Albuquerque, New Mexico

St. Jude's Children's Research Hospital  
Memphis, Tennessee

Simmons Comprehensive Cancer Center,  
The University of Texas Southwestern Medical  
Center at Dallas  
Dallas, Texas

University of Texas M.D. Anderson Cancer Center  
Houston, Texas

Huntsman Cancer Institute  
Salt Lake City, Utah

University of Virginia Cancer Center  
Charlottesville, Virginia

Fred Hutchinson Cancer Research Center  
Seattle, Washington