



Cancer Program
Annual Report 2016
WITH 2015 STATISTICS

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COMPREHENSIVE CANCER CENTER AT WAKE FOREST BAPTIST MEDICAL CENTER 2016

The Comprehensive Cancer Center at Wake Forest Baptist Medical Center was established in the early 1960's, and became a National Cancer Institute (NCI)-designated cancer center in 1974, shortly after the National Cancer Act was placed into law. The Cancer Center then received NCI "Comprehensive" designation in 1990, indicating excellence in patient care, research (basic, clinical and population sciences), training and education, and outreach. It is one of the earliest cancer centers to receive an NCI designation and has been continuously funded for more than 40 years. We are proud to be a part a very distinguished group of only 47 NCI-designated Comprehensive Cancer Centers in the country.

The mission of the Cancer Center is to reduce cancer incidence, morbidity, and mortality in the region, nationally, and internationally through cutting-edge research and treatments, education and outreach, and multi-disciplinary training. The Center's membership is comprised of 139 faculty members from 36 departments, and its research is divided into four Programs: Tumor Progression and Recurrence, Cancer Biology and Biochemistry, Clinical Research and Cancer Prevention and Control. To facilitate the scientific and translational goals of the programs, the Center has established thirteen Disease-Oriented Teams which are comprised of clinicians, population scientists, and basic scientists: brain, breast, cancer control and survivorship, gastrointestinal, genitourinary, gynecology, head and neck, hematologic malignancies, lung, melanoma, pediatrics, phase I and precision medicine, and sarcoma.

The Cancer Center recognizes the importance of building cross-departmental and transdisciplinary team approaches to advance the science and treatment of cancer. In addition to the Disease-Oriented Teams, other interdisciplinary research interest groups have formed. Topics include cancer genomics and precision medicine, the tumor microenvironment, nanotechnology, imaging, novel anticancer drugs and devices, cancer survivorship, tobacco control, and cancer health disparities. Collaborations with other centers and schools within the Institution are an essential element to the success of this research. The Cancer Center has strong connections with Wake Forest School of Medicine Clinical and Translational Science Institute, the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, the Wake

Forest Center for Human Genomics and Personalized Medicine, the Sticht Center on Aging, Wake Forest Innovations, the Wake Forest Institute for Regenerative Medicine, and the Wake Forest Maya Angelou Center for Health Equity.

The Cancer Center has continued its upward trajectory in research excellence and serves as the main tertiary referral center in a large geographic region ("catchment area"). Its catchment area includes the Piedmont and southern Appalachia, a region of 58 contiguous counties in North Carolina, Virginia, West Virginia and Tennessee. The majority of this region is rural and exhibits significant racial health disparities. Elevated age-adjusted smoking rates, obesity rates, cancer incidence, and cancer mortality are observed across the catchment area when compared with the rest of the United States. To target these issues, the Cancer Center conducts cutting-edge basic, clinical, and population research on the prevention, detection and treatment of cancer, and translates this knowledge into strategies to improve patient outcomes and reduce the incidence of cancer.

The Comprehensive Cancer Center provides a multidisciplinary approach to treatment in a recently expanded, state-of-the-art facility. The eleven-story Cancer Hospital houses the Institution's clinical and research oncology operations, including acute care oncology inpatient beds and an oncology intensive care unit, all outpatient oncology services, as well clinical trial management, nursing, pharmacy and administration staff. The Cancer Hospital provides an exceptional environment for patients, family and caregivers. With an average of 250 clinical trials available each year, patients have ready access to cutting-edge research and precision medicine.

"Our Comprehensive Cancer Center continues to make tremendous strides in cancer research that will benefit our patients through precision medicine, collaborative research, clinical trials, and new discoveries."

Boris Pasche, MD, PhD, FACP

Life-time

follow-up

is performed annually on patients in the registry

CANCER REGISTRY

The Cancer Registry works with physicians, administration, researchers and health care planners to provide support for cancer program development, ensure compliance with reporting standards, and serve as a valuable resource for cancer information with the ultimate goal of preventing and controlling cancer.

The Cancer Registry functions in accordance with guidelines set by the American College of Surgeons (ACoS). It plays an important role in ensuring that the cancer program is accredited by the Commission on Cancer and that the Breast Care Center is accredited by the National Accreditation Program for Breast Centers.

The Cancer Registry is involved in managing and analyzing clinical cancer information for the purpose of education, research and outcome measurement. The primary functions of the Cancer Registry are to collect relevant data, conduct lifetime follow-up and disseminate cancer information. The registry also participates in hospital-based, state and national studies, and research projects.

The Cancer Registry collects all malignant neoplasms and benign brain and central nervous system neoplasms. The registry also collects selected benign neoplasms and metastatic squamous cell and basal cell carcinoma of the skin approved by the Cancer Committee. The cancer data set includes patient demographics, cancer identification, extent of disease (stage), prognostic indicators, treatment, recurrence and outcome information. Effective January 1, 2012, the registry began the collection of the provider-based clinics cancer cases. The registry began the collection of cancer cases diagnosed on or after January 1, 2013 for Wake Forest Baptist Health Lexington Medical Center.

In 2016, the Cancer Registry began Rapid Quality Reporting System (RQRS) participation. RQRS is a reporting and quality improvement tool which provides real clinical time assessment of hospital level adherence

to quality of cancer care measures. The American College of Surgeons requires only the submission of breast, colon and rectal cancer cases. Currently, submission of all cancer cases is voluntary.

Life-time follow-up is performed annually on patients in the registry. Follow-up directly benefits patients and physicians by reminding them of the need for medical checkups. Continued surveillance ensures early detection of possible recurrence or a new primary. Outcome data provides survival information reflecting the effectiveness of treatment modalities. The Cancer Registry fulfills requests for cancer data from staff physicians, allied health professionals, outside institutions and requests for follow-up information from other cancer registries. All data requests are handled with the utmost care for the patient's confidentiality.

The Cancer Registry maintains data management and regulatory reporting on cancer statistics for various health care agencies. As required by law, cancer cases are reported to the North Carolina Central Cancer Registry (NC-CCR). The data submitted is shared with the North American Association of Central Cancer Registries (NAACCR) and the U.S. Centers for Disease Control and Prevention's National Program of Cancer Registries (CDC-NPCR). In addition, newly diagnosed cancer cases are submitted to the Commission on Cancer's National Cancer Data Base (NCDB). The NCDB is a comparative database for ongoing assessment of cancer patient care and is a joint project of the American College of Surgeons (ACoS) and the American Cancer Society.

The Association of North Carolina Cancer Registrars helps cancer registrars in the state maintain their continuing education hours by providing up-to-date educational workshops. The National Cancer Registrars Association serves as the premier education, credentialing and advocacy resource for cancer data professionals.

CANCER COMMITTEE

The Cancer Committee is one of the major components of being an approved cancer program of the American College of Surgeons (ACoS). The committee is responsible for planning, initiating, stimulating and assessing all cancer-related activities. The committee must be a multidisciplinary, standing committee that meets at least quarterly.

ACTIVITIES

- ▶ Clinical and programmatic goals are established, implemented and monitored each year.
- ▶ The Cancer Program Annual Report is compiled and published as an educational activity of the committee. Published journal articles and abstracts are included.
- ▶ Quality management activities and improvements are planned, reviewed and implemented each year.
- ▶ Studies that measure quality and outcomes are completed so that patients receive care that is comparable to national standards.
- ▶ A patient navigation process, driven by a community needs assessment, is established to address health care disparities and barriers to care for patients.
- ▶ A process to disseminate a treatment summary and follow-up plan to patients who have completed cancer treatment is developed, implemented and monitored.
- ▶ Benchmark reports from the ACoS' National Cancer Data Base are evaluated to improve the quality of care.
- ▶ A process to integrate psychosocial distress screening is monitored each year.
- ▶ The effectiveness of community outreach activities is monitored each year.
- ▶ The percentage of patients accrued to cancer-related clinical trials is monitored each year.
- ▶ The AJCC TNM staging by the managing physician is monitored.
- ▶ Cancer conferences are reviewed and monitored for frequency, multidisciplinary attendance, total case presentation and prospective case presentation.
- ▶ The College of American Pathology's scientifically validated data elements outlined on the surgical case summary checklist of the CAP publication, Reporting on Cancer Specimens, are reviewed and monitored.
- ▶ Nursing competency is evaluated annually as well as the rate of OCN to RNs.
- ▶ The Cancer Registry data and activities are evaluated and monitored for casefinding, accuracy of data collection, abstracting timeliness, quality, follow-up and data reporting.
- ▶ A subcommittee monitors the activities of the Breast Care Center.
- ▶ ACoS' standards are established, implemented, monitored, evaluated, achieved and documented to ensure CoC and NAPBC accreditation.



CANCER COMMITTEE MEMBERS

Edward Levine, MD, Chair \ Surgical Oncology
Joseph Bonkowski, PharmD, MHA, MS \ Pharmacy, Oncology Service Line
Wendy Cox \ Sr. Business Analyst, Oncology Service Line
Karen Craver, MT, MHA \ Associate Director Clinical Operations and Nursing
Kathy Flowers, MBA, BSN, RN, NE-BC \ Clinic Manager, Radiation Oncology
Kathryn Greven, MD \ Radiation Oncology
Zachary Hartsell, MHA, PA-C \ Administrative Director of Anesthesiology and Pain Service Line
Sally Hauser, MSN, ANP-BC \ Breast Care Center
Adrienne Hill, DO \ Physical Medicine Rehabilitation
Marissa Howard-McNatt, MD \ Surgical Oncology/Breast Care Center/Cancer Liaison Physician
Inez Inman, BS, RHIT, CTR \ Cancer Registry
Carrie Klamut \ American Cancer Society
Nadja Lesko, MD \ Diagnostic Radiology
Richard McQuellon, PhD, HSP-P \ Psychosocial Oncology and Cancer Patient Support Programs
Judith Messura, DMD \ Dentistry
Donna Morris, RN \ Director of Nursing, Hematology / Oncology
Samantha Ogle, RN \ Oncology Quality Program Manager
Amy Pace, MSW \ Care Coordination
William Jeff Petty, MD \ Hematology/Oncology
Susan Poindexter, BSN, RN \ Nursing Education Coordinator, Hematology / Oncology
Shadi Qasem, MD \ Pathology
Rebecca Rankin \ Director of Administration, Comprehensive Cancer Center
Carolyn Scott, MBA, BSN, RN \ Administrative Director Clinical Operations and Nursing
Edgar Staren, MD, PhD, MBA \ VP, Cancer Services/Deputy Dir. CCC/Executive Dir. Cancer Service Line
Anna Villa, MS, CGC \ Genetic Counselor
Wendy Watson, RD, CSO, LDN \ Nutritionist

CANCER REGISTRY STAFF

Inez Inman, BS, RHIT, CTR \ Manager
Janice Boggs, RHIT, CTR \ Oncology Data Analyst
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Michael Serwint, MD, CTR \ Oncology Data Analyst
Patricia Spry, CTR \ Oncology Data Analyst
Terri Swan, CTR \ Oncology Data Analyst



CANCER ACTIVITIES
2016

more than

2,100

patients come from surrounding areas

BLOOD AND MARROW TRANSPLANT PROGRAM

The Blood and Marrow Transplant (BMT) program celebrated its 26th year of providing transplants this year. During the past 26 years, the BMT program at Wake Forest has transplanted more than 2100 patients from the region and surrounding states—an extensive catchment area—capturing part of the underserved Appalachian area. We also celebrate 26 years of progress in BMT. For patients of all ages, the survival of BMT has never been better. Cures are more attainable for patients transplanted earlier in the course of their disease, in remission and with post-transplant modulation of minimal residual disease.

In 2016, 120 patients were transplanted using autologous, allogeneic, and haplo-identical approaches to stem cell transplantation. The number of patients transplanted reflects a large population of patients with hematologic malignancies for whom transplant is an important modality of care, in many cases improving disease free and overall survival. The program's goal is to provide state of the art care for our patients. All new cases are reviewed by our multidisciplinary team; as a group, we review every patient's case individually, identifying psychosocial factors, co-morbid conditions and disease risk factors that can interfere with a successful transplant. Our peer review process allows us to develop a multidimensional care plan for each patient. Our multidisciplinary team includes our physicians, advanced practice providers, pharmacists, nurse coordinators, financial coordinator, psychologist, social worker, tissue-typing specialist, stem cell processing team, stem cell procurement team, dietician and physical therapists.

As a program, we continue to grow and expand the quality service to our patients expected of a top tier program. Many initiatives this year are helping us reach our quality goals:

- ▶ We provide information about facilities, personnel, and diseases treated, transplant experience and survival in a transplant education class given by our BMT nurse coordinators that all patients are encouraged to attend.
- ▶ To improve patient experience and decrease length of stay in the hospital we offer outpatient high-dose chemotherapy and stem cell transplant for patients with multiple myeloma. Patients come daily to the Outpatient BMT Clinic in the cancer center to receive their care from a team of transplant-trained nurses and providers.
- ▶ We participate in a variety of clinical trial activities to accomplish our mission of improving the success of hematopoietic stem cell transplantation. We participate in studies sponsored by the Blood and Marrow Transplant Clinical Trials Network (BMT-CTN) and other multi-institutional studies through the Alliance cooperative group trials. We also have clinical trials that are the result of transplant clinicians partnering with laboratory and social scientists within the Wake Forest cancer center community.
- ▶ In collaboration with scientific and clinical colleagues in the cancer center we have expanded our BMT clinical program to include hematopoietic stem cell transplant from haplo-identical donors (“half-matched transplants”), widening donor availability for patients needing a transplant. This reflects recent advances in HLA typing and new combinations of immunosuppressive agents including post-transplant cyclophosphamide for graft-versus-host disease (GVHD) prevention.



► We are dedicated to improving the quality of life for bone marrow and stem cell transplant recipients. This year we began a survivor clinic run primarily by BMT advanced practice providers applying the post-transplant care recommendations published by the Center for International Blood and Marrow Transplant Research (CIBMTR) organization in partnership with the National Marrow Donor Program (NMDP)/Be The Match. This clinic focuses on the screening and preventative practices for long-term survivors after hematopoietic stem cell transplant and provides information to help other providers understand the specialized care needs of transplant recipients.

► We believe that pharmacists can impact the clinical and economic outcome of patients undergoing hematopoietic stem cell transplant. Having a PharmD in the various settings where care is delivered improves patient understanding of medication regimens, streamlines medical management, and helps the patient be more engaged in their care. This year we have included an outpatient PharmD in patient care to help with adherence and compliance in complex medical regimens, improve patient satisfaction through drug education, and improve management of symptoms. We believe this has added value to the transplant patient experience.

more than

460

patients were seen in the Survivor's Clinic

BREAST CARE CENTER

The multimodality Breast Care Center celebrated its 16th anniversary in January 2016. In 2016, 365 patients were seen with breast cancer in the Breast Care Center. This represents a 5 percent increase in comparison to 2015 and makes this our highest number of patients seen to date. The center's goal is to provide state-of-the-art care for the full spectrum of breast diseases in a patient-focused environment. All new cases are reviewed by our multimodality team with the mammographers prior to being seen in clinic. Typically, patients are seen by a multidisciplinary group consisting of surgeons, a radiation oncologist, plastic surgeon, nurse practitioners, genetic counselor and medical oncologist, if necessary. For example, our genetic counselors, Anna Villa and Thuy Vu, performed genetic testing in over 200 patients in the Breast Care Center.

In 2016 two new faculty members joined the Breast Care Center. Dr. Akiko Chiba joined Dr. Howard-McNatt as a new breast surgeon in the division. Dr. Chiba completed her breast surgery fellowship at Mayo Clinic and is seeing new patients in the multidisciplinary Breast Care Center and in Greensboro. Dr. Alexandra Thomas is a medical oncologist specializing in the treatment of breast cancer and is the new leader of the Breast Hematology Oncology division. She is also the co-leader of the Breast Disease Oriented Team, along with Dr. Howard-McNatt, and the leader of the Breast Integrated Practice Unit. Dr. Thomas joins Drs. Melin, Avery, Sorscher, and Klepin in the breast hematology and oncology section.

This Breast Care Center's 3D Tomosynthesis mammography unit, the latest breakthrough in mammography, continues to thrive, with locations at the Comprehensive Cancer Center, Medical Plaza-Clemmons and Wake Forest Baptist Health Outpatient Imaging. Screening and diagnostic imaging are offered on the unit. The number of mammograms increased in 2016 due to

the use of Tomosynthesis. Breast tomosynthesis minimizes the effect of overlapping breast tissue during imaging because the camera moves over the breast, taking images from multiple angles. Tomosynthesis provides a more accurate view of the breast and allows doctors to more effectively pinpoint the size, shape and location of any abnormalities. This can lead to better detection and fewer callbacks.

The Breast Cancer Survivor's Clinic in Clemmons is thriving. More than 460 patients were seen in the survivor's clinic making it the busiest year to date. Run by nurse practitioners, the clinic sees patients who are more than two years out from their initial breast cancer diagnosis. The survivor's clinic not only provides monitoring of these patients, but in-depth psychosocial and health maintenance of these high-risk women. In combination with the benign breast clinic in Clemmons, a total of 778 patients were seen at the Clemmons location in 2016.

The Breast Care Center hosted the Eleventh Annual Breast Cancer Symposium in September 2016. Lectures covered a wide range of topics from genetics to imaging to treatment and survivorship issues for breast cancer patients. The annual event is intended to provide continuing education to community providers with the goal of improving health care for those with breast disease.

Research is a key component of the Breast Care Center, which actively supports cooperative group breast trials from the NRG Oncology, the Alliance and SWOG. Wake Forest also opened the Shave 2 study with Yale which is a multi-institutional randomized control trial of routine shave margins vs. standard of care in breast cancer patients undergoing a lumpectomy. The Breast Care Center also has a variety of institutional research initiatives that have led to several publications in prestigious journals, including *Annals of Surgical Oncology* and *JAMA Oncology* during the past year, and several presentations at national meetings including the Society of Surgical Oncology Annual Cancer Symposium and the San Antonio Breast Cancer Symposium.

CANCER PREVENTION AND CONTROL RESEARCH PROGRAM

The Cancer Prevention and Control (CPC) Program is focused on scientific discovery across the cancer continuum—from primary prevention to survivorship—that translates into clinical, community and policy strategies to improve cancer outcomes. The CPC Program has 27 members in 12 departments led by Dr. Kristie Foley, Ph.D, Program Leader and Associate Director for Population Sciences, and Dr. Kathryn Weaver, Program Co-Leader and Assistant Director of the Office of Cancer Health Equity. The CPC Program conducts rigorous, hypothesis-driven, and translatable research that is responsive to two areas of inquiry:

- 1) Improve modifiable risk factors that will reduce cancer incidence, morbidity and mortality, with a strategic focus on tobacco control and obesity; and
- 2) Enhance survivorship outcomes, with a focus on quality of life, while incorporating patient-reported outcomes into survivorship care and addressing the symptoms and long-term effects of cancer treatment.

Our Program is also dedicated to reducing cancer disparities across programmatic aims. Program members have over \$8.3M dollars in extramural cancer-related research funding to achieve these aims. Some of the major ongoing projects include:

PRIMARY PREVENTION

- ▶ Implementation of Smoking Cessation Services within NCI NCORP Community Sites with Lung Cancer Screening Programs
- ▶ Effective Communication on Tobacco Product Risk and FDA authority
- ▶ Tobacco Use During the Transition to Adulthood
- ▶ Comparing Graphic to Text-Only Warning Labels to Discourage Cigarillo Smoking by Young Adults
- ▶ Building Social Networks to Improve Physical Activity and Weight Loss in Latino Parents
- ▶ The National Coalition Network for Tobacco and Cancer-free Living Centers for Disease Control and Prevention
- ▶ Building Capacity for Tobacco Research in Romania
- ▶ SipSmarter: A Nutrition Literacy Approach to Reducing Sugar-Sweetened Beverages
- ▶ Brenner FIT® Kohls Family Collaborative

SURVIVORSHIP

- ▶ A Prospective Study of the Impact of Breast Cancer on Symptoms and Functioning
- ▶ Reducing Lung Cancer Survivor anxiety with Brief Device-Guided Breathing
- ▶ Preventing Anthracycline Cardiovascular Toxicity with Statins
- ▶ Early Imaging Detection of Cardiovascular Injury after Cancer
- ▶ Understanding and Predicting Fatigue, Cardiovascular Decline and Events after Breast Cancer Treatment
- ▶ Evaluation of Inflammation and Mediators of Cardiovascular Aging in Childhood Cancer Survivors
- ▶ Community Hospital Identification of Cardiovascular Risk of Patients During Cancer
- ▶ Meta-analysis of Positive Psychology Interventions for Cancer
- ▶ Work Ability in Young Adult Survivors: A Quantitative Investigation
- ▶ Prepare to Care: A Supported, Self-management Intervention for Head and Neck Survivors
- ▶ A Behavioral Integrative Intervention for Reducing Cancer-related Fatigue
- ▶ Enhancing ARIC Infrastructure to Yield a New Cancer Epidemiology Cohort
- ▶ Post-doctoral Training in Cancer Survivorship
- ▶ The Role of Endogenous Opioidergic Systems in Mindfulness Mediation-related Pain Relief

REDUCING CANCER DISPARITIES

- ▶ A Primary Care Multilevel Health Colorectal Cancer Screening Intervention
- ▶ Evaluation of the Geographic Health Equity Alliance
- ▶ A Stepped-care Approach to Treat Distress in Rural Cancer Survivors
- ▶ Role of Diet-gene Interactions in Health Disparities

DEPARTMENT OF CARE COORDINATION

Nurse case managers and social workers are integral members of the health care team, providing services to patients and families. Staff members work collaboratively with other team members to assure that patient and family members' needs are addressed. Arrangements for post-discharge care are handled by the case manager or social worker. Services may include crisis intervention and counseling, and referrals for home health or DME (durable medical equipment), hospice or other local resources.

Patients being followed in the outpatient oncology clinics also have the services of a social worker available to them. The social worker follows patients who may need counseling or crisis intervention, assistance with transportation to and from medical appointments, referrals to local resources and information regarding medication assistance programs.



HEAD AND NECK ONCOLOGY

Head and neck cancer continues to constitute a significant proportion of cancers seen at Wake Forest Baptist Medical Center. In 2015, 552 patients were seen with tumors of the oral cavity, oropharynx, larynx, salivary gland, sinonasal cavity, thyroid and other head and neck sites.

The number of patients treated includes a large incidence of oral cavity and laryngeal cancers, most of which are tobacco-related. In addition, the head and neck cancer team cares for a large number of HPV-associated oropharyngeal tumors and advanced stage cutaneous cancers. These figures confirm the recognition of excellence and confidence in care delivery of the head and neck cancer team at Wake Forest Baptist.

A multidisciplinary Head and Neck Oncology Tumor Board meets weekly, and is staffed by representatives of the following departments:

- ▶ Otolaryngology Department—J. Dale Browne, MD, Christopher Sullivan, MD, and Joshua Waltonen, MD (General Head and Neck Oncology/Skull Base Surgery/Thyroid Tumors/Head and Neck Cancer Reconstruction)
- ▶ Radiation Oncology—Kathryn Greven, MD and Bart Frizzell, MD
- ▶ Medical Oncology—Mercedes Porosnicu, MD and Marcelo Bonomi, MD
- ▶ Dentistry Department—Judith Messura, DMD
- ▶ Pathology—James Cappellari, MD
- ▶ Diagnostic Radiology—Daniel Williams, MD

Consultations with nutritionists, speech/language pathologists and other adjunctive services are coordinated. Each new patient is evaluated by appropriate team members, and a treatment plan is recommended to the patient and referring physician. Resident attendance at the clinics is encouraged for educational benefits. In addition to discussion of new cases, related clinical research projects and didactic topics of interest are presented.

The coordination of multiple disciplines in the care of head and neck cancer patients is essential. These conferences allow for better patient convenience and timing of appointments, as well as closer and more effective physician consultative planning and management decisions in such a setting.

Current surgical, radiation and chemotherapeutic strategies emphasize state-of-the-art techniques that are designed to maximize cure rates while preserving function. Surgeons have expertise in free tissue transfer with microvascular reconstruction, allowing restoration of form and function that may be disrupted during large head and neck ablative surgeries. Minimally invasive surgical techniques include endoscopic resection techniques such as transoral robotic surgery (TORS), and have proven invaluable in treatment of tumors of the pharynx and larynx for many patients. Endoscopic resection of selected skull base tumors through a nasal approach is also offered. Advanced protocols utilizing the most up-to-date strategies for radiotherapy and chemotherapy are offered to appropriate patients in either definitive or adjunct treatment settings. The Gamma Knife stereotactic radiation unit is nationally known and available as well for select patients.

Multiple research trials are under way, an important component of the treatment and surveillance of head and neck cancer patients. Several publications in prestigious journals and presentations at national meetings result each year from these trials.



full-time faculty:

42 MDs & PhDs, 25 Physician Assistants & Nurse Practitioners

HEMATOLOGY AND ONCOLOGY

The Section on Hematology and Oncology emphasizes clinical and translational research and the multidisciplinary care of patients with cancer and hematologic diseases. The full spectrum of Hematologic and Oncologic disorders are expertly treated by the Section's faculty while areas of special multidisciplinary focus include the Prostate, Breast and Brain Tumor Centers of Excellence within the Comprehensive Cancer Center. Other areas of particular programmatic expertise include clinical and research programs involving patients with leukemia and lymphoma, myelodysplasia, myeloma, lung cancer, head and neck cancers, gastrointestinal cancers, genitourinary cancers, sarcoma, melanoma, and those requiring marrow and stem cell transplants or specialized geriatric oncologic care. Hematology faculty in the Section lead the institution's apheresis program and Special Hematology lab in addition to managing a busy protocol support laboratory and maintaining multidisciplinary clinics for patients with a variety of benign hematologic conditions. A nationally recognized Psychosocial Oncology program, established more than two decades ago, continues to be led and staffed by Section faculty as well. A multidisciplinary Precision Oncology program, in its second year, has leverage state of the art tumor genome sequencing technology in order to identify and match specific genetic abnormalities present in patients' tumors with currently available therapeutic agents that target those abnormalities. The goals of these and other team efforts are to:

- ▶ To optimize and personalize the care of patients with cancer and blood disorders.
- ▶ To meet the medical, emotional and informational needs of patients and their families.
- ▶ To enhance the opportunity for focused clinical and translational research.

Forty-two MD and PhD members compose the full-time faculty of the Section of Hematology and Oncology, and the clinical mission of the Section is also supported by 25 Physician Assistants and Nurse Practitioners. In 2016, the marrow transplant service provided 120 patients with potentially life-saving bone marrow or stem cell transplants. In addition, the Section maintains a longstanding commitment to training the Hematology and Oncology practitioners of the future; 12 clinical fellows are continuously enrolled in our three-year, ACGME-accredited Hematology and Oncology Fellowship training program. The training program also participates in and is compliant with the QOPI initiative—a program instituted by the American Society of Clinical Oncology to ensure patient-centered quality care and provide a mechanism for continuous quality assessment and quality improvement within our patient care programs. Hematology and Oncology faculty members remain committed to the educational mission of the Medical Center at large and play major teaching roles in the medical student curriculum and the Internal Medicine resident and physician assistant student training programs. They also serve as clinical and research mentors for a large number of medical students, residents, graduate students and post-doctoral fellows involved in cancer-related bench or clinical research activities.

As a group, Section of Hematology and Oncology faculty remain committed to providing state-of-the-art novel therapies to our patients. Multiple faculty members serve in leadership positions within a variety of national oncology cooperative trial groups including:

- ▶ The Alliance for Clinical Trials in Oncology (a merging of the cooperative groups CALGB [Cancer and Leukemia Group B], NCCTG [North Central Clinical Trials Group] and ACOSOG [American College of Surgeons Oncology Group])
- ▶ ABTC (Adult Brain Tumor Consortium)

- ▶ The Wake Forest NCORP Research Base (A National Cancer Institute-funded cooperative group headquartered at Wake Forest which develops and leads cancer prevention and control clinical trials and cancer care delivery research protocols within a network of community oncology practices across the country)

In 2015–2016, Section members enrolled approximately 1000 patients on a full spectrum of treatment, non-treatment and ancillary clinical trials including phase I, II and III cooperative group, investigator-initiated and industry sponsored studies. As part of our educational mission, Section faculty continue to lead the Charles L. Spurr Piedmont Oncology Symposium, which was established over 30 years ago as the Piedmont Oncology Association by Dr. Spurr, the founding director of our Cancer Center. The symposium occurs semiannually and brings together regional and national experts to provide CME updates for Hematology and Oncology physicians, fellows, nurses and research staff throughout the Southeast.

A number of faculty members also maintain active funded basic and translational science laboratories in addition to their clinical duties. The focus of these lab efforts include:

- ▶ The development of new treatment strategies for patients with melanoma.
- ▶ Finding novel therapeutics for patients with acute leukemias and understanding the mechanisms of resistance of current leukemia therapies.

- ▶ Understanding and enhancing the oncolytic activity of the vesicular stomatitis virus and using this virus as part of a multitargeted strategy for patients with head and neck cancers.
- ▶ Evaluating novel therapeutics to prevent and treat graft-versus-host disease.

Hospital-based activity for the Section continues to be centered around five inpatient services: two general Hematology and Oncology services, a leukemia service, a blood and marrow transplant (BMT) service and a hospitalist-run service that pairs hospitalists and hematologist/oncologist consultants to care for patients with medical complications of their malignant and hematologic disorders. In addition, Hematology and Oncology faculty continuously staff a busy inpatient consult service. A smooth transition between inpatient and outpatient care is a goal of our efforts to provide excellent patient care.

In addition to the inpatient and outpatient activities at Wake Forest Baptist Medical Center, Hematology and Oncology faculty also maintain full-time, full-service practices in Clemmons, Elkin, Lexington, Mount Airy and Statesville. A regional practice based at the Veterans Hospital in Salisbury is staffed by multiple faculty members and new outpatient VA clinics will soon be open in Kernersville and Charlotte. These locations allow military service members and their dependents to receive cancer and blood disorder care much closer to home than was previously possible.





DEPARTMENT OF OPHTHALMOLOGY

The Wake Forest Baptist Health Eye Center and the Department of Ophthalmology, part of the Division of Surgical Sciences at Wake Forest School of Medicine, offer comprehensive ophthalmic tumor diagnosis and treatment to people in western North Carolina, South Carolina, eastern Tennessee, southwestern Virginia and West Virginia. Primary and secondary neoplasms of the eye, ocular adnexa and orbit are evaluated and treated using state-of-the-art technology.

The most common primary malignant intraocular neoplasm in adults is choroidal melanoma. The incidence of choroidal melanoma is about six people per 1 million population, and 30 to 40 new patients with this diagnosis are evaluated and treated annually at the Eye Center. Large intraocular melanomas are often treated by enucleation or removal of the eye. Currently, most eyes can now be salvaged and treated by Iodine 125 radioactive plaque application. This treatment is a combined surgical-radiation modality in which a radioactive implant is sutured to the eye wall overlying the tumor, delivering a dose of radiation to the melanoma in order to cause regression. This procedure is performed by Dr. Craig Greven, in conjunction with the Department of Radiation Oncology. Another technique, transpupillary thermotherapy, is a laser procedure that can be used to treat melanomas of the choroid as well.

Tumors of the eyelids and orbit are managed by Drs. Patrick Yeatts and Molly Fuller of the Orbital and Oculoplastic surgery service. Lymphoma, a

malignancy with frequent orbit involvement in adults, and rhabdomyosarcoma, the most common primary malignant orbital tumor in childhood, often present to the orbital service for evaluation. Our surgeons work closely with physicians in the Department of Neurosurgery, Otolaryngology and Hematology/Oncology providing a multidisciplinary approach to tumors occurring in the sinuses and anterior cranial fossa that may encroach upon the eye and orbit. For tumors that occur on the eyelids and face, Drs. Yeatts and Fuller work closely with colleagues in the Department of Dermatology, who use techniques to minimize eyelid and facial tissue loss with tumor removal, that, in turn, minimizes the complexity of oculofacial repairs enhancing functional and cosmetic outcomes.

Malignant tumors of the ocular surface are treated not only by Dr. Yeatts but also by Dr. Matthew Giegengack a corneal and external disease specialist. Malignancies of ocular surface may be treated surgically, with cryotherapy or with topical chemotherapy. Treatment regimens are tailored to the individual patient and may include one or all three modalities in an effort to preserve vision and limit complications of treatment. A focus of Dr. Yeatts' current investigation is the use of topical chemotherapy agents in treating ocular surface neoplasms. In addition to treatment of neoplasms, Dr. Giegengack is expert in ocular surface reconstruction.

Eye Center physicians use a multidisciplinary approach in the management of ocular and orbital neoplasms. The collaborative efforts of the Eye Center and other specialists at Wake Forest Baptist allow state-of-the-art oncologic treatment for patients.

ORTHOPAEDIC ONCOLOGY

Orthopaedic Oncology, part of the Cancer and Musculoskeletal Service Lines, is committed to the comprehensive and specialized care of patients with tumors. Within the department, there are two fellowship-trained orthopaedic oncologists, Scott Wilson, MD, and Cynthia Emory, MD, who see adult and pediatric patients in the Comprehensive Cancer Center three days a week and make every attempt to see new patients within 48–72 hours of referral. Colleagues in Medical Oncology, Radiation Oncology, Musculoskeletal Radiology and Pathology are immediately available for consultation and collaboration, contributing greatly to the team approach. Drs. Wilson and Emory facilitate the needs of patients, often collaborating with other surgical specialists at the medical center—including surgical oncologists, spine surgeons, pediatric surgeons and plastic surgeons—to maximize patient outcomes and the treatment of complex conditions.

There are three primary categories of tumors treated by Orthopaedic Oncology: Benign and malignant soft tissue tumors, benign and malignant bone tumors, and metastatic bone lesions.

Every year, more than 500 operations are performed for orthopaedic tumors or tumor-related conditions. Initiation of treatment starts with a biopsy to determine the type of tumor. Most biopsies are now performed as small needle biopsies in the office, avoiding the cost, risk, pain and inconvenience of an open biopsy in the operating room. Patients will often know their diagnosis on the same day as their office biopsy, facilitating rapid implementation of treatment.

New technologies are routinely embraced. The orthopaedic oncology surgeons use intraoperative CT and computer navigation for complex pelvic tumor surgery, improving the accuracy of identifying exactly where the tumor is in multiple dimensions. Limb-sparing operations, where resection of malignant bone tumors is followed by innovative reconstruction techniques—including modular endoprotheses, allograft utilization, and vascularized bone and tissue transfers—are often performed, allowing limbs to be saved that previously would have required amputation. Patients with these tumors are routinely treated with limb salvage techniques due to advances in earlier detection and adjuvant treatment with chemotherapy and or radiotherapy. An extremely close working relationship with faculty from both medical oncology and radiation oncology has further developed our team approach for the treatment of bone and soft tissue sarcomas.

Benign lesions of bone and soft tissues are encountered more frequently than primary malignant tumors and account for many of the surgeries performed. However, many benign bone and soft tissue lesions can be treated without surgery, with the diagnosis obtained by a variety of studies including radiographs, nuclear bone scans, CT scans, MR imaging and needle or open biopsy. This reliance on sophisticated radiographic imaging has led to a close working relationship with faculty members from the musculoskeletal radiology section of the Department of Radiology.

Because of the complexity of tumors, interdepartmental communication is critical. This has led not only to improved patient care but also to innovative research with colleagues in several other departments. Recent clinical trials include the surgical treatment of metastatic tumors in the arm with an innovative and minimally invasive implant to improve patients' pain and function. Regular orthopaedic oncology teaching conferences are part of the core curriculum to train the next generation of orthopaedic surgeons in addition to an annual orthopaedic oncology review course. Regularly scheduled multidisciplinary conferences enable the Orthopaedic Oncology team to review the clinical findings in conjunction with the radiology and pathology of tumors with colleagues from other disciplines so that the team can make optimal treatment recommendations for patients.



PEDIATRIC ONCOLOGY

The Pediatric Oncology program sees 60–70 new oncology patients per year. It accepts newly diagnosed patients through age 18. A dedicated hematology/oncology unit in Brenner Children’s Hospital contains 16 private inpatient beds, five outpatient clinic rooms and a day hospital/observation area. Patients come from the Piedmont and central/western North Carolina, as well as southwest Virginia and southern West Virginia. Most referrals come from pediatricians and family practitioners.

Pediatric Oncology is staffed by six pediatric hematologists/oncologists: Marcia Wofford, MD, Tom McLean, MD, Natalia Dixon, MD, Kevin Buckley, MD, Thomas Russell, MD, and David Kram, MD. It has four pediatric nurse practitioners, two physician assistants, three doctors of pharmacy, two clinical research associates and a patient navigator. There are numerous dedicated pediatric hematology/oncology nurses for clinic and hospital work, as well as a home and school visitation program for children with cancer. The Pediatric Oncology Psychosocial Team is composed of a social worker, counselor, psychologist, child life specialist, art therapist and chaplain. Pediatric Oncology receives professional support from therapists, nutritionists and pediatric pharmacists. There is a weekly Pediatric Oncology team meeting as well as a pediatric tumor conference every other week, which includes pediatric surgeons, radiation oncologists, pathologists, radiologists, residents and medical students.

The Children’s Cancer Support Program (CCSP) is staffed with a full-time counselor/director, with the focus being patient education as well as many levels of individual and group, social and psychological support for on-therapy and off-therapy patients and families. The CCSP has a Pediatric “Pal” program that pairs interested medical students with specific patients for emotional and psychosocial support. Pediatric Oncology is an active member of the Children’s Oncology Group (COG). Dr. Marcia Wofford is Associate Dean for Student Affairs for Wake Forest School of Medicine, and continues to practice pediatric hematology/oncology. Dr. Tom McLean serves as the section chief of Pediatric Hematology/Oncology, is the medical director of the inpatient and outpatient pediatric hematology/oncology services, and is also a mentor for the medical school’s learning communities

(“houses”). Dr. Natalia Dixon is the director of the pediatric hemoglobinopathy and hemophilia programs. Her primary interests are in pediatric hematology, specifically anemia, general non-malignant hematology, hemoglobinopathies, and thrombotic and hemorrhagic disorders in children. Dr. Kevin Buckley’s interests include general pediatric hematology/oncology, infections in immunocompromised populations and immune reconstitution after chemotherapy. In addition to pediatric hematology/oncology, Dr. Buckley is also board certified in pediatric infectious diseases. Dr. Thomas Russell practices general pediatric hematology/oncology. He has a wide range of clinical interests and is also a dedicated and enthusiastic educator. He is an Associate Director of the Pediatrics Residency Program. Dr. David Kram is our newest faculty member. He joined the section in 2016 and practices general pediatric hematology/oncology. In addition to the pediatric hematologists/oncologists, Pediatric Oncology has active COG members from the disciplines of surgery, pathology, radiation oncology, radiology, nursing, pharmacy, cytogenetics and data management. The primary research conducted by Pediatric Hematology/Oncology is enrollment of patients onto clinical trials.



PHARMACY

The Department of Pharmacy assumes complete pharmaceutical care for patients throughout their inpatient, outpatient and home care. During an inpatient stay, pharmacists and pharmacy technicians are involved in optimizing medication management as members of the interdisciplinary care team. The pharmacy team also completes admission medication reconciliation, patient education and discharge medication review to ensure optimal care transitions.

In the ambulatory setting, the pharmacy team supports safe and effective processing of intravenous chemotherapy orders in six infusion clinics. Utilizing several important safety checks in verifying and compounding chemotherapy, the pharmacy team prepared over 38,000 patient specific doses in 2016. In addition to compounding services, clinical pharmacists are embedded in the ambulatory multispecialty medical oncology clinic to provide direct patient education, adherence monitoring, and improve access to medications.

In the home setting, the Wake Forest Community and Specialty Pharmacies provide drug-specific pharmaceutical care plans and routine patient follow-up. Pharmacists secure access to limited distribution oral oncology agents through Wake Forest Baptist-operated pharmacies. Over 36,000 prescriptions were dispensed in the Cancer Center community pharmacy in 2016 with over 3500 prescriptions for oral chemotherapy. The pharmacy team works proactively with insurance companies to minimize the time from physician prescribing to delivery to the patient.

The Department of Pharmacy also fulfills an educational and research mission. The Pharmacy Department offers a Postgraduate Year 2 specialty pharmacy residency program to train pharmacists to care for cancer patients. It also trains medical students and residents through participation on the patient care team. Students from regional schools of pharmacy also are incorporated into the pharmacy care model. The Investigational Drug Service provides oversight of investigational studies through protocol review and research committee participation. Pharmacy operations ensure proper storage and preparation of investigational medications to maintain compliance with research standards.

Lastly, the Pharmacy Department is a global leader in adoption of automated intravenous medication preparation for hazardous drugs through its partnership with Loccioni. Since 2012, more than 30,000 doses have been compounded on the APOTECA chemotherapy

compounding robot. Using high-precision robotics helps ensure safety in preparation for patients, family members and employees. Through this partnership a new device that assists technicians in making chemotherapy that cannot be made on the robot was developed, leveraging the same safety tools as the robotic arm. Over the last year greater than 80 percent of all chemotherapy was made on the APOTECA platform!



COMMUNITY OUTREACH / PUBLIC EDUCATION

One of the Comprehensive Cancer Center's goals is promoting public awareness of cancer. Prevention and early detection are stressed through educational programs and activities. The following were highlights of our public awareness program.

- ▶ Cancer Talk/Prevention/Health Fair: priority population Hispanics, at area Hispanic churches
- ▶ Health Fair/Health Screenings/Physician Consults: included prostate information, blood test, lung function, skin cancer screening, BMI
- ▶ Wake Forest Pink Game: wear pink for free admission, health information brochures, games
- ▶ ActionHealth "Colon and Rectal Cancer: Know Your History, Change Your Risks"
- ▶ Kick Butts Day: Organized by the Campaign for Tobacco-Free Kids
- ▶ Seasons of Survival Moving Beyond Treatment
- ▶ Healthy Lungs, Healthy You/Lung Cancer Education and Smoking Cessation
- ▶ Get Your Rear in Gear Run/Walk; Colon Cancer Coalition
- ▶ Middle School Health and Wellness Fair: screenings, demonstrations, workshops
- ▶ Lung Cancer Initiative of NC: A Network of Hope and Action; panel discussion on lung cancer
- ▶ Susan G. Komen Northwest NC Race for the Cure Run/Walk
- ▶ High School Health Fair: distribution of information from nutrition, diabetes, cancer, dental health
- ▶ Skin Cancer Screening
- ▶ Relay for Life Walk: American Cancer Society
- ▶ Community Health and Wellness Fair: health screening, medical consultations, cooking demonstrations, exercise classes, cancer and health education
- ▶ Lecture: "Benign and Malignant Breast Disease"
- ▶ High School health class: importance of HPV vaccination and the role that HPV plays in cancer development

- ▶ Pathways to Survivorship
- ▶ Winston-Salem Open–Wake Forest University Tennis Tournament: cancer information brochures
- ▶ BestHealth "Protect and Detect: Everything You Need to Know about Sunscreen and Skin Cancer"
- ▶ Annual Breast Cancer Symposium
- ▶ Annual The PINK Ribbon Talks
- ▶ Radio interview "Breast Cancer"
- ▶ Sting of White Roses/Komen Shades of Hope Day: NC Black Repertory Theatre; panel discussion
- ▶ BestHealth Seminar on Lung Cancer Screening and Prevention: information on CT Screening and Tobacco Cessation
- ▶ MML Conference Life Matter: Stepping up to Myeloma
- ▶ ActionHealth Breast cancer screening and imaging presentation
- ▶ Facebook Live "Breast Benign and Malignant Disease"
- ▶ BestHealth "Breast Health Awareness"
- ▶ Corporate headquarters: breast health, imaging and cancer screening presentation
- ▶ Basic Black TV: Breast cancer in black women
- ▶ Lecture "Changing Management of Breast Cancer"
- ▶ Lecture "Understanding Oncology: It's Development, Diagnosis, Treatment and Prevention"



more than

\$1,300,000
in grants

RADIATION ONCOLOGY

Radiation Oncology continues to grow as it strives to become a "Top 10" radiation oncology department nationally. There are currently 10 radiation oncologists, nine radiation physicists and two radiation biologists. The department enjoys the Outpatient Comprehensive Cancer Center building with multidisciplinary cancer care from medical and surgical oncology as well as diagnostic radiology. With in-department CT/PET and MRI scanners as radiation therapy simulation devices, the department is one of the most technologically sophisticated in the world.

The Radiation Oncology Residency Training Program attracts high-quality residents and currently has six serving. The ratio of applicants to positions is about 100 to one. Radiation physics and both classical/molecular radiation biology are taught to the residents, who also spend six to 12 months performing basic laboratory research. The department received an NIH/NCI T32 Training Grant in 2005, which ended in 2015. Focused on translational radiation oncology for post-doctoral fellows in clinical radiation oncology, biology and physics, four trainees have completed the program.

Clinical and basic research activities are with NIH/NCI grants, foundation/society grants and industry grants totaling \$1,300,000. Novel radiation dose modifying agents and the study of radiation injury to the normal tissues are two areas under active investigation in the Radiation Biology laboratories. Researchers have partnered with NASA to investigate countermeasures for knee and hip joint degradation during spaceflight. Bio-anatomic radiation therapy treatment planning and delivery, integrating functional and bio-physiological imaging with MRI, MR spectroscopy and positron emission tomography are all areas of active investigation by the Radiation Physics section. Our physics department has ongoing studies to provide efficacy testing of products designed to improve irradiation-induced cutaneous damage.

The Gamma Knife Stereotactic Radiosurgery (GKSRS) program was initiated in 1999 and continues to be one of the seven busiest in the United States, treating approximately 40 patients per month. The Stereotactic Body Radiotherapy (SBRT) program is one of the select few in the nation, with nearly a decade of experience treating more than 5,000 patients in that time. Other new programs and technologies now in clinical use include high-dose rate brachytherapy, brachytherapy simulation and treatment planning utilizing the Integrated Brachytherapy Unit, fractionated stereotactic radiotherapy, intensity modulated radiation therapy, image-guided radiation therapy and Volumetric Arc Therapy (VMAT).

Radiation Oncology has three affiliated practices in west central North Carolina that are staffed with physicians and physicists from Wake Forest Baptist: Hugh Chatham Memorial Hospital in Elkin, Lexington Medical Center–Radiation Oncology and Iredell Memorial Hospital in Statesville. Iredell Memorial Hospital physicians joined our professional staff in February 2014, adding to the physics services previously provided. In total, Radiation Oncology and its affiliated practices treat more than 160 patients per day with radiation therapy, making this largest provider of radiation therapy services in the Piedmont Triad and north central North Carolina.

In the past year, the main campus and regional practices consulted 3,600 patients, saw 5,000 in follow-up and treated approximately 2,500 with external beam radiation therapy and approximately 1,000 with special procedures including Gamma Knife/Stereotactic radiosurgery, prostate and gynecologic brachytherapy, total body irradiation and image-guided radiation. In summary, the Department of Radiation Oncology is well positioned locally, regionally, nationally and internationally as a leader in the treatment and research of radiation therapy for malignant and select benign diseases.

SUPPORTIVE CARE AND SURVIVORSHIP SERVICES

The Comprehensive Cancer Center at Wake Forest Baptist Medical Center provides programs and services that are integrated into the ongoing care of patients in order to make professional assistance available easily and seamlessly. For example, all patients are screened for distress when they are seen by their cancer healthcare provider. The integration of personalized, patient-centered care at the point of delivery of medical services is a unique aspect of care at our Comprehensive Cancer Center.

The Psychosocial Oncology and Cancer Patient Support Programs were designed to address the emotional distress of patients and family members. The mission of these programs is to reduce suffering and enhance quality of life of patients as well as caregivers during the diagnosis, treatment and survivorship process, from the beginning of care throughout the life span. These programs are woven into a broader network of professional services that are part of the supportive care and survivorship services network for our medical center and community. Research has shown that patients who access three or more supportive care services are likely to have increased satisfaction and better overall outcomes.

Access to such services is readily available to all of our patients treated in medical oncology, surgical oncology, and radiation oncology. Many studies have reported the efficacy of psychosocial interventions and the importance of quality of life to patients.

The Psychosocial Oncology and Cancer Patient Support Programs are staffed by approximately 30 volunteers and six professionals trained in counseling, administrative support, and therapeutic music. Most of our volunteers are either veteran cancer patients themselves or have been caregivers for patients over the years. They bring deep listening and empathy that have been finely tuned

through their own experience. Volunteers provide hospitality, empathic listening, and a welcome presence for all patients attending our cancer center. One of our volunteers, paraphrasing Mother Teresa, commented, "I may not be able to do great things as a volunteer, but I can do small things with great love." Both professional staff and volunteers perform a very important navigation function by helping to connect patients and families to needed services.

A hallmark of our program is the integration of our services into the ongoing medical care of patients. For example, we can see patients for counseling or other services such as massage while they are being seen concurrently by healthcare providers for medical treatment. It is not uncommon for our staff to be counseling with a patient during their chemotherapy treatment. This reduces the necessity for travel and overall cost to the patient for their care. This dimension of integrated psychosocial care is rare in cancer care facilities given the logistical challenge to doing so. Fortunately, we are well supported by philanthropy and institutional funds to provide these services to patients with cancer and caregivers without charge.

The Psychosocial Oncology and Cancer Patient Support Programs provide counseling services, patient education, patient advocacy, educational/support groups, teaching, financial aid, and research activities nested within the section of Hematology and Oncology in the Comprehensive Cancer Center at Wake Forest Baptist Medical Center. We also are able to provide specialized cancer recovery and survivorship-skills training for patients.

The psychosocial care of distressed patients is linked to important outcomes. For example, successful treatment of depression can enhance recovery as well as reduce the cost of treating patients.



The supportive care and survivorship network within Wake Forest Baptist provides many other services in the medical center. Such services include massage therapy, healing touch, Reiki (a form of alternative medicine in which the practitioner transfers “universal energy” to the patient to encourage healing), therapeutic music, recreation therapy, supportive chaplain services, palliative care, social work services, nutritional guidance and patient financial assistance. We also have identified additional services in the community (e.g., acupuncture) that can be helpful to patients. Supportive care and survivorship services are made available by a host of professionals within our institution (see below for details).

The Psychosocial Oncology and Cancer Patient Support Programs facilitate many of these professional services during the course of patient care. While a significant proportion of cancer patients may need professional psychosocial care, all our patients can benefit from kindness, deep listening, and compassion.

The Psychosocial Oncology and Cancer Patient Support Programs promote these qualities in all of our healthcare providers and support staff. We provide the type of care that facilitates physical, emotional, and spiritual healing in patients. We know that the quality of life of our patients can be enhanced by timely and early interventions to help patients maintain their lifestyle even while undergoing life-changing therapies in a cancer center. As one patient suggested, “...I’m not going to give up my life just because I’m in treatment...I intend to live... I intend not only to survive but to thrive through my treatment with all the help I can get...”

SUPPORTIVE CARE AND SURVIVORSHIP SERVICES

- ▶ **Gentle Yoga:** These classes are open to cancer patients and survivors and their close family members or friends. Mats and equipment are available. Classes are held in the Meditation Room, second floor, Outpatient Comprehensive Cancer Center. Individual sessions may be set up free of charge.
- ▶ **Guided Imagery and Hypnosis:** Suggestive guidance in a trance state helps patients manage pain and nausea and improve coping.
- ▶ **Massage Therapy:** Eight types of massage are offered in the Cancer Center, at the Sticht Center and at Medical Plaza–Miller.
- ▶ **Meditation Room:** Located on the second floor of the outpatient Cancer Center, this room is set aside for quiet meditation or prayer.
- ▶ **Mindful-based Stress Reduction:** Learn practices to cultivate calmness and relaxation.
- ▶ **Therapeutic Music** is offered through a trained harpist and a group of volunteer musicians.

SUPPORTIVE SERVICES

- ▶ **Genetic Counseling:** Conducts risk assessment for hereditary cancer syndromes.
- ▶ **Nutrition Counseling and Education:** Available at the outpatient Cancer Center to help manage treatment-related nutrition side effects such as weight loss, nausea, sore or dry mouth, constipation or diarrhea, taste changes and difficulty swallowing. Symptoms can often be minimized with some dietary changes.
- ▶ **Palliative Care:** Enhances quality of life, prevents and relieves suffering of patients with serious and/or terminal illness.
- ▶ **Pastoral Care:** Chaplains are available for individual consultation, prayer and planning of advance directives. A chaplain leads a brief meditation on the first Wednesday of every month at 1:30 pm in the Meditation Room on the second floor of the Cancer Center. Additionally, services are held in Davis Chapel on Sunday at 10 am and Monday, Wednesday and Friday at noon.
- ▶ **Conversations of Love (Advance Directive Education):** In an informal setting, one of Wake Forest Baptist’s chaplains lead discussions about how individual values shape goals for medical care during times of illness, and how advance care planning can assist in ensuring that these goals be honored during moments of serious illness. Through proactive conversations with loved ones, family members and friends can provide a gift of love through understanding the goals of care.
- ▶ **Patient Financial Resources Services (PFRS):** Resource recovery specialists provide financial relief to patients and families who do not have the resources to pay for health care services. These specialists will assist patients and families in establishing payment plans, pursuing financial assistance from Medicaid and Agency programs, and applying for charity care and other discounts.
- ▶ **Patient Advocate:** Cancer Services, Inc. assists patients and families in addressing the financial and social challenges that people with cancer often encounter.
- ▶ **Physical Therapy (PT) and Occupational Therapy (OT):** PT rehabilitates gross motor skills. OT improves specific movements and tasks. Lymphedema management helps reduce enlargement, fullness and achiness after a lumpectomy.
- ▶ **Social Work Services (SWS):** Located on the third floor of the Outpatient Comprehensive Cancer Center, Social Work Services can assist with finding financial resources, coping with illness, caregiver stress, working with the medical team to set up and coordinate home care, ordering medical equipment, and general information and referral.

SUPPORTIVE CARE AND SURVIVORSHIP SERVICES – 2016 CLINICAL TRACKING

CATEGORY TOTALS	ANNUAL TOTAL
Support Room Hem/Onc (# pts)	790 contacts
Support Room Radiation (# pts)	480 contacts
Patient/Family Contact (Unscheduled: Clinic/Hospital)	443 contacts
Outpatient Counseling Session	833 contacts
HOA, HOB, HOC	355 contacts
Solid Tumor–Inpt Interview/Ind Counseling	0 contacts
Leukemia–Inpt Interview/Ind Counseling	436 contacts
BMT Assessment	164 contacts
BMT–Inpt Interview/Ind Counseling	131 contacts
Surgical Onc–Inpt Interview/Ind Counseling	127 contacts
GynOnc–Inpt Interview/Ind Counseling	9 contacts
RadOnc–Inpt Interview/Ind Counseling	0 contacts
Crisis Intervention	39 contacts
Phone Contact (Pt-Related)	856 contacts
SUPPORT GROUP	
Coffee & Conversation for Caregivers	127 attended
CPSP Welcome Hour	642 attended
Pathways to Survivorship	85 contacts
Seasons of Survival	147 contacts
Financial Aid to Patients	433 contacts
SECU Place Referrals	15 contacts
OTHER	
Harp Therapy (patient contacts)	411 contacts
Student Intern Patient Contacts	1143 contacts
Student Intern Hours	828 hours
Volunteers–annual total hours	3098 hours
Volunteers–annual total contacts	33,256 contacts
Support Room Hem/Onc	21,051 contacts
Support Room Radiation	11,970 contacts
Resource Room	235 contacts
MEETINGS/EVENTS	
Volunteer Education/Meetings	0 volunteers
Community Liaison/Meetings	35 liaisons
Community Presentation (inc support groups)	16 presentations
Teaching Students/Residents/Fellows on-campus	74 presentations
Health Team Meetings/Rounds	45 meetings
Committee Meetings (medical center)	55 meetings
Med Ctr Staff Support/Consult w interdisc. Staff	701 events
Staff Development (Educ conferences/staff mtgs)	135 events
Other	116 contacts
MONTHLY CONTACT TOTALS	7666 CONTACTS
TOTAL INPATIENT CONSULTS	1261 CONTACTS

CANCER SURVIVORSHIP PROGRAM

The Cancer Center is dedicated to the continued growth and development of the Cancer Survivorship Program. In 2014 the program became a department of the Cancer and Blood Disorders Service Line. It has been providing focused cancer survivorship follow-up care to breast cancer patients in two clinics at Wake Forest Baptist Health Medical Plaza–Clemmons. These clinics typically see 15 to 20 patients per week for long term survivorship follow-up care. The lung cancer survivorship clinic began seeing lung cancer survivors in January 2015. The clinic providers are nurse practitioners with special interest and expertise in the care of breast and lung cancer patients. The Blood and Marrow Transplant Program also began a survivorship program in January 2016, serving an average of four patients per week. The Wake Forest Baptist Medical Center is currently involved in a strategic expansion of

the overall Cancer Survivorship Program based on the recommendations from nine institutional working groups with the purpose of augmenting the current state to the “ideal” state cancer center survivorship program. The intent is to complement the already robust survivorship program, including those listed, the Cancer Patient Support Program and FaithHealth Program. This will include an already identified primary site for the survivorship program. In addition to housing the “medical care” survivorship clinic at the Medical Center, it will be the resource for and / or referral center point for Nutrition, Rehabilitation, Pain Management, Financial / Legal / Work Counseling, Complementary / Integrative and Education / Advocacy support activities.

more than

8,444 outpatient visits

SURGICAL ONCOLOGY

Surgical Oncology is a key component of the Comprehensive Cancer Center. It is extensively involved in multimodality consultations for the care of patients with melanoma, sarcoma, endocrine tumors and diseases of the breast, as well as the full spectrum of gastrointestinal malignancy from esophagus to anus. The service is very busy, with 1,578 major operative cases and more than 8,444 outpatient visits this year.

The clinical service includes eight fellowship-trained surgical oncologists, two surgical oncology fellows, four surgical house officers, two to three medical students, five advanced practitioners and four nurses. Edward Levine, MD (Chief of the Service), Russell Howerton, MD, Perry Shen, MD, Marissa Howard-McNatt, MD, Kostas Votanopoulos, MD, PhD, Jennifer Cannon, MD, Clancy Clark, MD and Akiko Chiba, MD, serve as the clinical faculty. Specialized advanced nurses support the breast care clinic, inpatient surgical oncology and gastrointestinal tumor care.

CLINICAL INITIATIVES

The multimodality Breast Care Clinic (BCC) was founded in January 2000 and is an integral part of Surgical Oncology. The BCC evaluates about 100 breast patients every week, with 365 new breast cancer cases evaluated in 2016. The BCC is staffed by surgical oncology, medical oncology, radiation oncology, advanced nursing practitioners, plastic surgeons, research nurses, clinic navigators and genetic counselors. The BCC was among the first to be recognized by and continues to be certified by the NAPBC, and accreditation was renewed for three years in 2015. The BCC facilitates complex multimodality care in a setting that fosters participation in state-of-the-art research trials. Dr. Howard-McNatt is the lead breast surgeon for this clinic, and supervised an expansion of the clinic to the Clemmons office. This year we have expanded our faculty with the addition of Dr. Akiko Chiba to the breast service. The clinical work in breast cancer works hand in hand with the research team in the BCC.



Esophageal cancer is evaluated by a multimodality team led by Dr. Levine. The team was previously awarded grants from the National Cancer Institute, to evaluate new imaging technology, which could help define the patients who achieve a complete response to chemotherapy and radiation. The results of these research efforts have been published and are widely cited, and our multimodality team serves as a regional reference clinic for care of patients with cancer of the esophagus. Newer approaches to therapy, including minimally invasive esophagectomy, are now part of the standard care for these patients. The team includes not only surgical oncology, but radiation and medical oncology, as well as gastroenterologists with specific experience and expertise in esophageal cancer. These efforts are supported by an advanced nurse coordinator.

HepatoPancreaticoBiliary (HPB) surgery relates to complex liver and pancreas surgery, led by Dr. Shen with Drs. Howerton and Clark. Dr. Shen heads a clinical team supported by a weekly CME-accredited HPB multimodality conference. The group is now working on minimally invasive approaches to hepatic resection, and has performed several successful “robotic” resections. Newer approaches to liver surgery have afforded improved outcomes not only to patients with primary hepatic tumors, but those with cancers metastatic to the liver as well. Extensive experience with newer approaches to pancreatic tumors and disease has led to streamlined care plans for patients as well as research initiatives for pancreatic patients. Dr. Shen was awarded a prestigious visiting Professorship as the American College of Surgeons representative to Germany this year.

Dr. Votanopoulos continues his efforts to bring surgical oncology expertise beyond the main campus. He leads the General Surgery effort at the VA Medical Center in Salisbury, N.C., while maintaining an increasingly active practice at the Cancer Center on the main campus. He has a broad-based surgical oncology practice and has been increasingly active in research recently completed his PhD, as well. He was awarded a visiting professorship to the University of Oregon this year.

Dr. Jennifer Cannon brings additional expertise in the care of endocrine tumors to the Surgical Oncology team. She has already expanded the capabilities for treatment of the full spectrum of endocrine tumors of the thyroid and parathyroid. She has also initiated minimally invasive adrenal gland (adrenalectomy) procedures.

Our innovative treatment of malignant disease that has spread throughout the peritoneal cavity with cytoreductive surgery and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) is nationally and internationally recognized. This program is led by Dr. Levine with the support of Drs. Shen, and Votanopoulos. We currently perform approximately 100 HIPEC cases annually, with more than 1,350 cases followed in our prospective data registry for HIPEC survivors. Ours is one of the largest experiences with this complex modality, worldwide. Dr. Levine, and the HIPEC team, published the largest single institutional experience with HIPEC, with over 1,000 patients treated, in the *Journal of the American College of Surgeons* 2014; 518: 573-587. Dr. Levine was awarded a visiting professorship to the University of Massachusetts this year to discuss the HIPEC program.

This HIPEC program continues to draw patients from around the country and is linked to a variety of research initiatives, such as the largest quality-of-life study for HIPEC patients worldwide (presented at the Society of Surgical Oncology meeting this year. Dr. Levine was recently awarded a research grant Smith family foundation to continue the lead the field groundbreaking research into the genetics of cancer of the appendix, which commonly benefits from therapy with HIPEC. Dr. Levine published a book on HIPEC entitled "Intraperitoneal Cancer Chemotherapy Principles and Practice.

EDUCATION

Faculty members of Surgical Oncology are dedicated to teaching the next generation of physicians to care for those with oncologic diseases. Trainees on service are part of a team bringing considerable clinical expertise to serve patients who require cancer staging, treatment and follow-up due to primary, recurrent or metastatic malignancy. A substantial portion of clinical effort is also devoted to the resection of metastatic disease, including that of the liver, lung, peritoneum and lymph nodes. Extensive clinical experience in a tertiary referral setting provides the surgical know-how for dealing with rare and unusual neoplasms. With this rich background, fellows, house staff and medical students on the service are extensively involved in multimodality consultations for the care of cancer patients with melanoma, sarcoma, endocrine tumors and diseases of the breast, as well as the full spectrum of gastrointestinal malignancies, from esophagus to anus. This includes preoperative and postoperative care, in addition to operative management. The BCC also hosts house officers from Gynecology, Internal Medicine and Family Medicine.

A weekly multidisciplinary/multimodality surgical oncology conference (led by Dr. Levine), which serves as the CME-accredited "tumor board" for the institution, meets Fridays at noon in the Cancer Center. This is supplemented by a CME-accredited HPB tumor conference meeting (led by Dr. Shen) weekly on Tuesdays at noon. On Sept. 30th, 2016, Surgical Oncology sponsored its 11th annual breast cancer symposium.

A surgical oncology fellowship was initiated in 2010. The two-year fellowship is for general surgeons seeking additional qualifications and training in advanced techniques in surgery and oncology training. All of the fellows to complete the program have obtained faculty positions (at Georgetown, Johns Hopkins, Louisiana State University, Eastern Virginia University and most recently

the University of Wisconsin). The American Board of Surgery recently created a new certification program in Surgical Oncology. Our application to the Board of Surgery for accreditation was approved in 2014 and our fellowship is now fully accredited (one of only 23 programs in North America so honored).

RESEARCH

Surgical Oncology actively supports research in basic science, translational science and clinical arenas. Clinical trials in association with the NRG are coordinated by Dr. Levine, who serves as their principal investigator. Surgical Oncology also collaborates with investigators in the Alliance group, as well as other members of the Comprehensive Cancer Center, including Public Health Sciences, Exercise Physiology, Gastroenterology, Cancer Biology, Radiology, Nuclear Medicine, Medical and Radiation Oncology. In 2016, Surgical Oncology enrolled nearly 250 patients on treatment protocols and more than 1,077 on tissue-procurement studies. The surgical oncology faculty had a total of 23 research protocols open during the year. Currently, the clinical and research faculty of Surgical Oncology holds more than \$500,000 in active extramural funding, as well as receiving significant philanthropic assets for cancer research.

Translational research projects evaluating genetic and proteomic changes associated with cancer of the breast, GI and hepatobiliary malignancy, as well as peritoneal carcinomatosis, are ongoing. Dr. Levine initiated such studies of the genetics of cancer of the appendix, and published new data on genomic signatures predictive of outcomes for this disease. Dr. Votanopoulos continues to be prolific in publication of manuscripts related to gastric and appendiceal cancer as well as HIPEC procedures. Drs. Shen and Clark have a focused clinical effort in pancreatic and hepatobiliary malignancy evaluating innovative ways to treat primary and metastatic liver tumors. Dr. Clark has also initiated innovative research evaluating "Fitbit" data for predicting outcomes for older patients undergoing major cancer surgery. Dr. Howard-McNatt published research this year evaluating breast cancer care in elderly women.

These efforts led to the publication of a record 50 manuscripts and book chapter in 2016, as well as 53 major presentations at leading surgical and oncology societies. These publications span the gamut from basic science to translational and clinical issues relevant to several tumors.



UROLOGIC ONCOLOGY

The Urologic Oncology program within the Comprehensive Cancer Center brings together clinicians from multiple departments in the Medical Center to facilitate the provision of multidisciplinary cancer care to carry out innovative clinical trials to improve the care of patients with genitourinary malignancies. Through the activities of the genitourinary oncology group, special expertise is directed toward the diagnosis, staging, treatment and follow-up of patients with tumors of the prostate, bladder, kidney/ureter, testis and other genitourinary sites. The latest techniques including laparoscopic and robotic approaches are offered to patients. The genitourinary clinical trial group established about five years ago consists of basic scientists, urological, medical and radiation oncologists. They oversee the success of numerous in-house, industry and cooperative oncology group trials through Alliance, National Institute of Health and Radiation Therapy Oncology Group (RTOG). Through

these mechanisms, patients have access to clinical trials for most genitourinary malignancies that incorporate multiple modalities of treatment to produce the best possible treatment outcome. Between 2010 and 2016, accrual to genitourinary oncology clinical trials has more than tripled. In addition to the clinical activities noted above, the urologic group also supports, through additional collaborations, significant translational and basic research efforts in Urologic Oncology.

The Section of Urologic Oncology, part of the Department of Urology, includes K.C. Balaji, MD; Ronald Davis, MD, MBA; Ashok Hemal, MD; and Dan Rukstalis, MD. The group works closely with rest of the genitourinary oncology team, including Christopher Thomas, MD, Rhonda Biting, MD and Michael Goodman, MD, from medical oncology, and Bart Frizzell, MD, from radiation oncology.

GYNECOLOGIC ONCOLOGY

As an integral part of the Comprehensive Cancer Center gynecologic oncology provides comprehensive care for patients with pre-malignant and malignant gynecologic disease. This includes surgical management and chemotherapy as well as radiation treatment in conjunction with colleagues in radiation oncology. There is a strong collaborative relationship with surgical oncology, medical oncology and interventional radiology. In 2015, gynecologic oncology treated over 200 newly diagnosed gynecologic malignancies predominantly diseases of the uterine corpus and ovary. Gynecologic oncology has a significant market percentage of the gynecologic malignancies in the 19 county service area. Outreach clinics include Greensboro, Hickory and Lexington. The recent addition of a nurse navigator has stream-lined efforts in patient care.

Surgical management of gynecologic malignancies is a mainstay of treatment including radical resection, use of intraoperative hyperthermic chemotherapy and an increasing volume of minimally invasive procedures, which includes robotic assisted laparoscopic approaches for uterine malignancies under the leadership of Dr. Michael Kelly.

Gynecologic oncology has a significant involvement in collaborative clinical trials through the NRG and Gynecologic Oncology Group as well as industry. There is a major emphasis in the management of newly diagnosed and recurrent ovarian cancer using novel chemotherapy and biological agents.

A multidisciplinary gynecologic oncology tumor board comprised of gynecologic oncologists, radiation oncologists, gynecologic pathologists and diagnostic as well as interventional radiologists meet to discuss challenging cases.

The section of gynecologic oncology in the department of Obstetrics and Gynecology includes:



Michael G Kelly, M.D.
Associate Professor
Department of Obstetrics and
Gynecology



Samuel S Lentz M.D.
Professor and Section Head
Department of Obstetrics and
Gynecology



CANCER DATA
2015



2015 CANCER REGISTRY DATABASE

TOTAL CASES*	NUMBER	PERCENT
Lung	646	12.5
Breast	533	10.3
Prostate	370	7.1
Colorectal	359	6.9
Oral cavity, pharynx	307	5.9
Melanoma of skin	299	5.8
Brain, CNS	285	5.5
Leukemia	265	5.1
NH Lymphoma	207	4.0
Kidney, renal pelvis	182	3.5
Pancreas	173	3.3
Bladder	145	2.8
Thyroid	125	2.4
Multiple myeloma	109	2.1
Uterus	102	2.0
CMPD, MDS	91	1.8
Larynx	90	1.7
Stomach	73	1.4
Liver	71	1.4
Esophagus	70	1.4
Ovary	65	1.3
Connective tissue	61	1.2
Other endocrine	61	1.2
Other female	60	1.2
Unknown primary	50	1.0
Gallbladder, biliary	32	0.6
Cervix	31	0.6
Other skin	31	0.6
Hodgkins disease	30	0.6
Mets SCCa/BCCa	29	0.6
Retroperitoneum	28	0.5
Eye	27	0.5
Small intestine	26	0.5
Bone	25	0.5
Other urinary	21	0.4
Anus, anal canal	20	0.4
Nasal, sinus	20	0.4
Testis	19	0.4
Ill-defined	11	0.2
Other digestive	10	0.2
Other male	8	0.2
Pleura, mediastinum, heart	6	0.1
Peripheral nerves	4	0.1
Thymus	4	0.1
Total Cases	5181	100.0

GENDER	NUMBER	PERCENT
Male	2743	53.0
Female	2438	47.0

RACE	NUMBER	PERCENT
White	4409	85.1
Black	677	13.1
Other	95	1.8

ETHNICITY-HISPANIC	NUMBER	PERCENT
Male	47	0.9
Female	74	1.4

CLASS OF CASE	NUMBER	PERCENT
Analytic/new dx	4046	78.1
Non-analytic/recurr	582	11.2
Consult, dx workup	553	10.7

RESIDENCE	NUMBER	PERCENT
North Carolina	4385	84.6
Other States in USA	794	15.3
Outside of USA	2	0.04

PATIENT HISTORY	NUMBER	PERCENT
Family History	3332	64.3
Tobacco History	3129	60.4
cigarette	917	
cigar/pipe	23	
snuff/chew/smokeless	100	
combination use	31	
previous use	2058	
Alcohol History (2 or more drinks/day)	659	12.7
current use	450	
past history	209	

PRIMARY NEOPLASMS	NUMBER	PERCENT
One primary only	3656	70.6
First of two primaries	237	4.6
Second primary	825	15.9
Third primary	145	2.8
Fourth primary	29	0.6
Fifth primary	7	0.1
Sixth primary	2	0.04
Seventh primary	2	0.04
Eighth primary	1	0.02
Ninth primary	1	0.02
Benign neoplasms	276	5.3

* includes malignant, in-situ, selected benign cases, newly diagnosed, recurrent and consult cases

COMPARISON OF 2015 WFBMC, STATE AND NATIONAL DATA

PRIMARY SITE	WFBMC		NORTH CAROLINA		USA	
	CASES	PERCENT	CASES	PERCENT	CASES	PERCENT
Lung	543	15.0	8669	15.5	221200	13.3
Breast	379	10.5	8048	14.4	234190	14.1
Prostate	248	6.8	7998	14.3	220800	13.3
Colorectal	221	6.1	4633	8.3	132700	8.0
Oral cavity, pharynx	219	6.0	1467	2.6	45780	2.8
Leukemia	191	5.3	1400	2.5	54270	3.3
Melanoma of skin	171	4.7	2589	4.6	73870	4.5
Kidney, renal pelvis	156	4.3	1978	3.5	61560	3.7
Pancreas	149	4.1	1391	2.5	48960	3.0
NH Lymphoma	143	4.0	2094	3.8	71850	4.3
Thyroid	111	3.1	1349	2.4	62450	3.8
Brain, CNS	102	2.8	732	1.3	22850	1.4
Bladder	101	2.8	2459	4.4	74000	4.5
Uterus	94	2.6	1569	2.8	54870	3.3
Multiple myeloma	69	1.9	841	1.5	26850	1.6
Larynx	65	1.8	531	1.0	13560	0.8
Liver, bile ducts	63	1.7	830	1.5	35660	2.2
Connective Tissue	51	1.4	378	0.7	11930	0.7
Stomach	50	1.4	740	1.3	24590	1.5
Ovary	42	1.2	722	1.3	21290	1.3
Esophagus	41	1.1	552	1.0	16980	1.0
Small intestine	22	0.6	322	0.6	9410	0.6
Cervix	17	0.5	386	0.7	12900	0.8
All other sites	372	10.3	4118	7.4	105850	6.4
Total Cases	3620	100.0	55799	100.0	1658370	100.0

Note: Includes newly diagnosed invasive cancer cases (includes bladder in-situ cases).

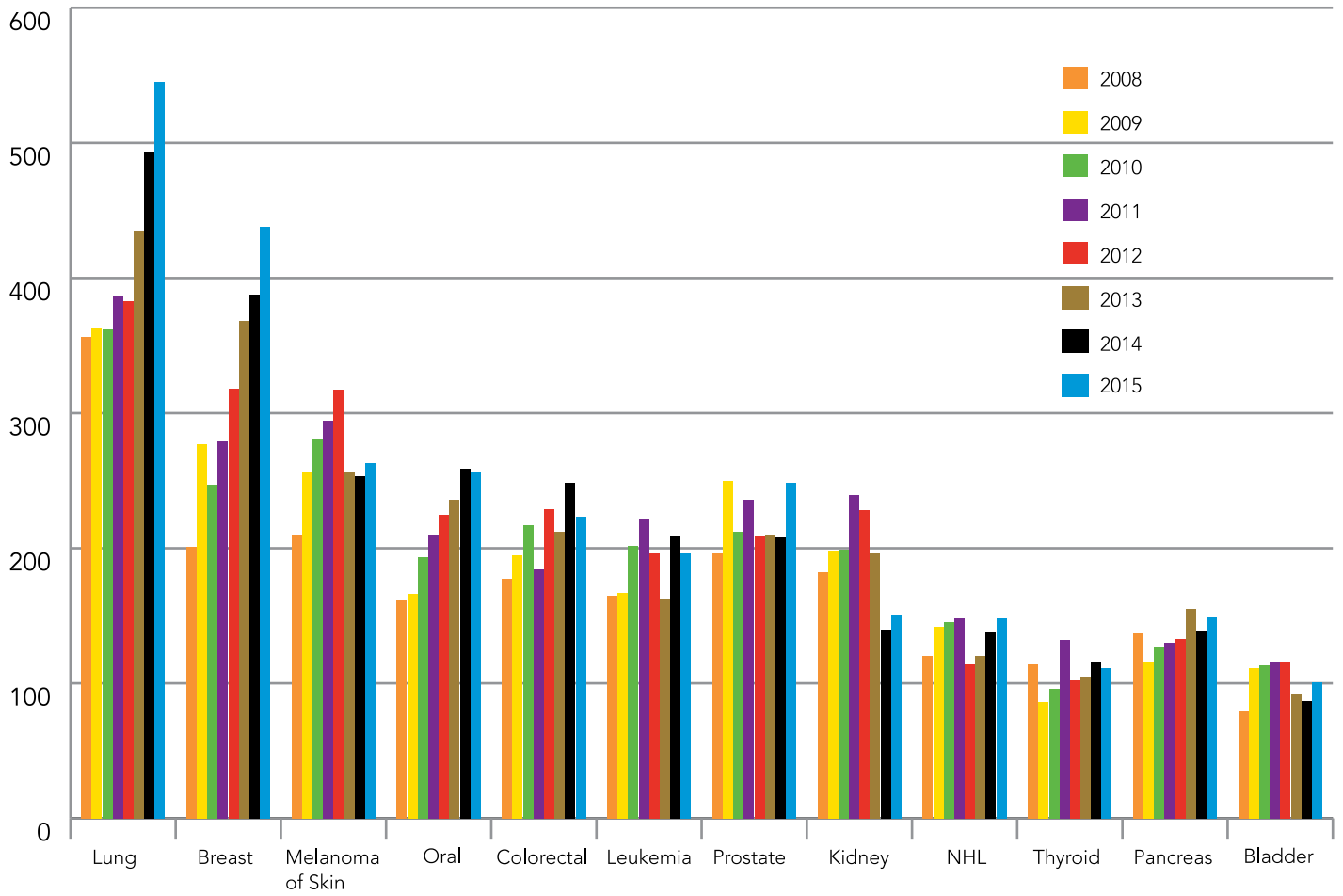
Excludes basal and squamous cell skin cancers, in-situ (except for bladder), benign neoplasms, non-analytic cases, and consults.

WFBMC – exact figures

NC – estimated numbers from NC-Central Cancer Registry Facts and Figures 2015

USA – estimated numbers from American Cancer Society Cancer Facts and Figures 2015

COMPARISON OF WFBMC MOST PREVALENT SITES BY YEAR – NEWLY DIAGNOSED CASES



PRIMARY SITE DISTRIBUTION 2015

Site	Total	Class of Case*			Gender and Race							
		A	NA	C	white		black		other		Hispanic	
					male	female	male	female	male	female	male	female
Total cases	5181	4046	582	553	2276	2012	382	295	38	57	47	74
Oral cavity, pharynx	307	256	20	31	202	76	16	6	3	1	2	1
lip	10	10	0	0	8	2	0	0	0	0	0	0
tongue	74	64	6	4	53	16	3	1	1	0	0	0
gum	12	11	0	1	3	8	1	0	0	0	0	0
floor of mouth	14	13	0	1	8	3	0	2	0	0	1	0
palate	6	5	1	0	2	2	1	1	0	0	0	0
other mouth	22	17	3	2	15	5	1	0	0	1	0	0
salivary, malignant	28	23	0	5	13	11	1	1	1	0	1	0
salivary, benign	39	36	1	2	19	19	1	0	0	0	0	0
tonsil	56	43	5	8	46	6	3	1	0	0	0	0
oropharynx	14	10	1	3	12	1	1	0	0	0	0	0
nasopharynx	12	9	1	2	7	1	2	0	1	0	0	1
pyriform sinus	10	7	1	2	9	1	0	0	0	0	0	0
hypopharynx	9	7	1	1	6	1	2	0	0	0	0	0
other oral cavity	1	1	0	0	1	0	0	0	0	0	0	0
Digestive system	834	595	98	141	400	292	62	45	7	10	7	11
esophagus	70	53	7	10	46	10	7	3	4	0	0	0
stomach	73	54	4	15	35	25	9	2	0	2	0	0
small intestine	26	22	3	1	12	9	4	1	0	0	0	0
colon	256	154	53	49	108	106	14	18	0	5	1	4
rectosigmoid	20	14	2	4	9	6	3	1	0	0	0	1
rectum	83	55	9	19	52	26	1	1	1	1	1	0
anus/anal canal	20	13	4	3	6	12	1	1	0	0	0	0
liver	71	47	9	15	37	14	12	2	1	0	4	1
gallbladder	14	10	1	3	2	9	0	2	0	1	0	0
biliary	18	16	0	2	9	6	1	2	0	0	0	0
pancreas	173	149	6	18	82	64	10	12	1	1	1	2
other digestive	10	8	0	2	2	5	0	0	0	0	0	3
Respiratory system	760	628	57	75	361	271	72	33	8	10	3	2
nasal cavity	9	6	1	2	7	0	1	1	0	0	0	0
sinuses	11	7	1	3	8	1	1	1	0	0	0	0
larynx	90	67	16	7	4	22	13	3	1	2	2	0
lung-non small cell	559	47	34	54	259	207	51	26	7	6	1	2
lung-small cell	87	74	5	8	39	39	5	2	0	2	0	0
thymus	4	3	0	1	1	2	1	0	0	0	0	0
Pleura, mediastinum, heart	6	6	0	0	6	0	0	0	0	0	0	0
Bone	25	22	1	2	8	9	2	2	1	0	2	1
Hematopoietic system	465	306	59	100	227	140	41	36	4	5	8	4
multiple myeloma	109	69	12	28	42	32	15	16	0	1	2	1
lymphoid leukemia	93	64	16	13	46	28	7	3	1	2	5	1
myeloid leukemia	149	123	10	16	74	46	15	8	3	0	1	2
other/leukemia	23	9	5	9	13	6	2	2	0	0	0	0
CMPD,MDS	91	41	16	34	52	28	2	7	0	2	0	0

Site	Total	Class of Case*			Gender and Race							
		A	NA	C	white		black		other		Hispanic	
					male	female	male	female	male	female	male	female
Skin	359	304	34	21	211	135	7	1	2	1	2	0
melanoma	299	263	23	13	181	114	2	1	1	0	0	0
other skin	31	18	6	7	11	13	4	0	0	1	2	0
mets SCCa/BCCa	29	23	5	1	19	8	1	0	1	0	0	0
Peripheral Nerves	4	3	1	0	0	1	0	3	0	0	0	0
Retroperitoneum	28	20	3	5	10	17	0	0	0	0	0	1
Connective tissue	61	51	4	6	40	15	2	2	0	0	2	0
Breast	533	438	49	46	2	424	1	78	0	9	0	19
Female genital system	258	232	14	12	0	218	0	29	0	3	0	8
vulva	40	38	1	1	0	32	0	8	0	0	0	0
vagina	10	9	0	1	0	7	0	2	0	0	0	1
cervix	31	25	2	4	0	27	0	3	0	0	0	1
uterus	102	94	4	4	0	87	0	12	0	1	0	2
ovary, malignant	50	42	7	1	0	44	0	1	0	2	0	3
ovary, borderline	15	15	0	0	0	12	0	2	0	0	0	1
other female	10	9	0	1	0	9	0	1	0	0	0	0
Male genital system	397	271	86	40	295	0	94	0	4	0	4	0
penis	8	6	0	2	6	0	2	0	0	0	0	0
prostate	370	248	85	37	271	0	92	0	4	0	3	0
testis	19	17	1	1	18	0	0	0	0	0	1	0
Urinary system	348	273	57	18	222	71	28	11	5	2	4	5
kidney	172	151	16	5	98	40	19	6	2	1	3	3
renal pelvis	10	10	0	0	2	6	2	0	0	0	0	0
ureter	9	5	2	2	5	3	0	0	1	0	0	0
bladder	145	101	35	9*	107	22	6	5	2	0	1	2
other urinary	12	6	4	2	10	0	1	0	0	1	0	0
Eye	27	25	1	1	17	8	1	0	0	0	0	1
Brain, CNS	285	231	40	14	95	139	18	14	2	7	6	4
brain, malignant	118	102	7	9	47	45	9	4	2	3	5	3
brain, benign	167	129	33	5	48	94	9	10	0	4	1	1
Thyroid/Endocrine	186	164	17	5	50	90	12	17	0	5	0	12
thyroid	125	111	11	3	24	71	4	11	0	5	0	10
adrenal	3	2	1	0	2	1	0	0	0	0	0	0
other, malignant	3	3	0	0	2	1	0	0	0	0	0	0
other, benign	55	48	5	2	22	17	8	6	0	0	0	2
Lymphoma	237	175	34	28	105	85	19	10	2	4	7	5
NH Lymphoma	207	148	32	27	90	79	1	9	2	2	4	3
Hodgkins disease	30	27	2	1	15	6	1	1	0	2	3	2
Unknown Primary	50	38	5	7	20	18	4	8	0	0	0	0
Ill-defined	11	7	2	2	5	3	3	0	0	0	0	0

*Class of Case: A=analytic, newly diagnosed; NA=non-analytic, first seen with recurrent disease; C=consults, diagnostic workup

Note: Numbers include Wake Forest Baptist Medical Center main campus, provider-based clinics (Elkin, Lexington, Mt. Airy), Statesville practice, Davie Medical Center, Medical Plaza - Clemmons.

PUBLISHED ABSTRACTS

CANCER PREVENTION AND CONTROL (CPC) CANCER BIOLOGY AND BIOCHEMISTRY (CBB) CLINICAL RESEARCH PROGRAM (CRP) TUMOR PROGRESSION AND RECURRENCE PROGRAM (TPR)

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