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2015 CANCER PROGRAM ANNUAL REPORT

WITH 2014 STATISTICS

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Boris Pasche, MD, PhD, FACP
Director, Comprehensive Cancer Center

Comprehensive Cancer Center

AT WAKE FOREST BAPTIST MEDICAL CENTER

The Comprehensive Cancer Center at Wake Forest Baptist Medical Center started in the early 1960s, and became a National Cancer Institute (NCI)-designated cancer center in 1974, shortly after the National Cancer Act became law. The Cancer Center then received an 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 part of a very distinguished group of only 45 NCI-designated comprehensive cancer centers in the country. In addition, the Cancer Center is currently ranked the #1 cancer hospital in the state of North Carolina and in the Southeast by *U.S. News & World Report*.

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 multidisciplinary training. The Cancer Center is comprised of more than 125 faculty members from 36 departments. The Center's 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 Cancer Center has established 12 disease-oriented teams: brain, breast, gastrointestinal, genitourinary, geriatrics, gynecology, head and neck, hematologic malignancies, lung, melanoma, pediatrics 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, which are comprised of clinicians, population scientists and basic scientists, other interdisciplinary research interest groups have formed. Topics include cancer genomics and precision medicine, the tumor microenvironment, nanotechnology, imaging, novel anticancer drugs, novel anticancer 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 the Wake Forest Baptist Medical Center 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 and the Wake Forest Institute for Regenerative Medicine.

The Cancer Center is the main tertiary referral center for patients in a large geographic region of the Piedmont and southern Appalachia that extends into portions of Virginia, West Virginia and Tennessee. The Cancer Center provides a multidisciplinary approach to treatment in a recently expanded, state-of-the-art facility. The 11-story Cancer Center 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 as clinical trial management, nursing, pharmacy and administration staff. This new building 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.

The Cancer Center strives to serve the needs of its community, focusing on cancer risk factors with elevated incidence in the area, such as smoking rates and obesity, and building initiatives to reduce cancer health disparities. The Cancer Center works closely with the Maya Angelou Center for Health Equity at Wake Forest Baptist, which was founded by the renowned poet to address health disparities across the region and the nation. We also established a Cancer Health Equity initiative in 2012 with the sole mission of addressing the needs of our patients in both culturally and linguistically relevant ways. As an example, we hired a Hispanic Clinical Trial Navigator in mid-2014 to provide navigation services, clinical trial education and community outreach specifically to our Hispanic population.

"Our Comprehensive Cancer Center has made tremendous strides in this past year by offering cutting-edge research, clinical trials, and new discoveries such as those in precision medicine with the goal of delivering the best care possible to our patients, their families and caregivers."

Boris Pasche, MD, PhD, FACP

The Cancer Registry is involved in managing and analyzing clinical cancer information for the purpose of education, research and outcome measurement.

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.

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

- 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/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.
- 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.
- The Cancer Registry data and activities are evaluated and monitored for casefinding, accuracy of data collection, abstracting timeliness, follow-up and data reporting.
- A subcommittee monitors the activities of the Breast Care Center.

CANCER COMMITTEE MEMBERS

Edward Levine, MD, Chair \ Surgical Oncology
Joseph Bonkowski, PharmD, MHA, MS \ Pharmacy, Oncology Service Line
Dale Browne, MD \ Otolaryngology
Wendy Cox \ Operational Coordinator, Cancer Center Nursing Administration
Karen Craver, MT, MHA \ Associate Director Clinical Operations and Nursing
Inez Inman, BS, RHIT, CTR \ Cancer Registry
Audrey Bell Farrow, MBA, MHA \ Community Engagement Coordinator
Ronda Granger, MSW, LCSW, ACM \ Care Coordination
Kathryn Greven, MD \ Radiation Oncology
Sally Hauser, MSN, ANP-BC \ Breast Care Center
Marissa Howard-McNatt, MD \ Surgical Oncology \ Breast Care Center \ Cancer Liaison Physician
Carrie Klamut \ American Cancer Society
Nadja Lesko, MD \ Diagnostic Radiology
Glenn Lesser, MD \ Hematology and Oncology
Richard McQuellon, PhD \ Cancer Patient Support Program
Judith Messura, DMD \ Dentistry
Donna Morris, RN \ Director of Nursing, Hematology Oncology
Lisa Odom, MBA, MHA, RHIA \ Health Information Management
Samantha Ogle, RN, MSN, OCN \ Oncology Quality Program Manager
Susan Poindexter, 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
Cameron Thomason \ Administrative Director, Department of Pathology and Laboratory Medicine
Cathleen Wheatley, MS, RN, CENP \ Chief Nurse Executive and Vice President, Clinical Operations

CANCER REGISTRY STAFF

Inez Inman, BS, RHIT, CTR \ Manager
Janice Boggs, RHIT, CTR \ Oncology Data Analyst
Jenean Burris, RHIT, CTR \ Oncology Data Analyst
Adele Nissen, RHIT, CTR \ Oncology Data Analyst
Pamela Childress-Obenauf \ Oncology Data Analyst
Kimberly Ortiz, CTR \ Oncology Data Analyst
Shawnetta Peebles, RHIT, CTR \ Oncology Data Analyst
Michael Serwint, MD, CTR \ Oncology Data Analyst
Patricia Spry, CTR \ Oncology Data Analyst
Terri Swan, CTR \ Oncology Data Analyst

2015 CANCER ACTIVITIES

more than

2,000

patients received transplants

BLOOD AND MARROW TRANSPLANT PROGRAM

The Blood and Marrow Transplant (BMT) program celebrated its 25th year of providing transplants this year. During the past 25 years, the BMT program at Wake Forest Baptist has performed transplants on more than 2,000 patients in the region and surrounding states — an extensive catchment area capturing part of the underserved Appalachian area. We also celebrate 25 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 2015, 119 patients received transplants using autologous or allogeneic stem cells. 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, dietitian 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, 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 Baptist's 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 preventive 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 patients 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 regiments. This improves patient satisfaction through drug education and improves management of symptoms.

more than

450

patients were seen in the Survivor's clinic

BREAST CARE CENTER

The multimodality Breast Care Center celebrated its 15th anniversary in January 2015. In 2015, 421 new breast cancer patients were seen throughout the Cancer Center, making 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 a surgeon, radiation oncologist, plastic surgeon, genetic counselor and medical oncologist, if necessary.

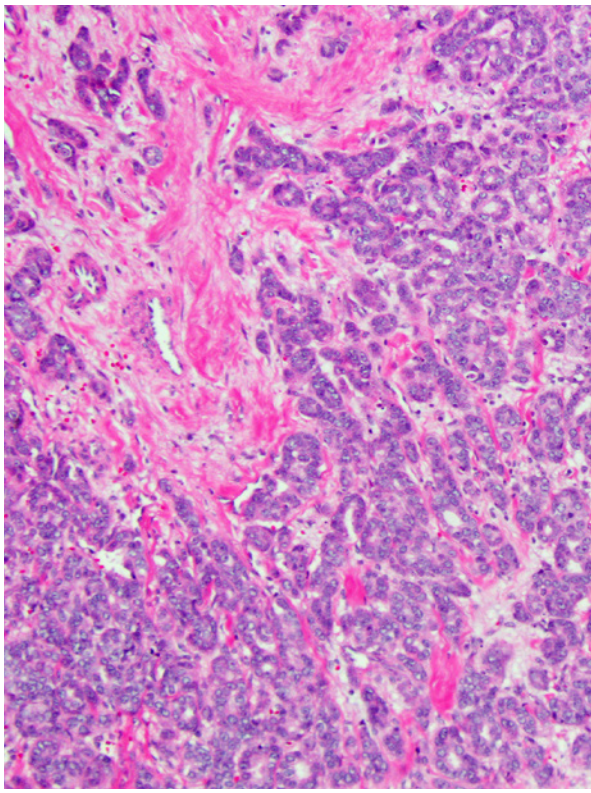
The Breast Care Center is certified by the National Accreditation Program for Breast Centers. This year we passed our re-accreditation for another three years. This accreditation is the product of expertise from a variety of disciplines working together for the benefit of patients.

This Breast Care Center's 3D Tomosynthesis mammography unit, the latest breakthrough in mammography, continues to thrive at our Medical Plaza – Clemmons and Outpatient Imaging locations. Screening and diagnostic imaging are offered on the unit. The number of mammograms increased in 2015 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.

Marissa Howard-McNatt, MD, the Director of the Breast Care Center, was awarded "The National Breast Cancer Patient Navigation Program" through a grant by Susan G. Komen and Walgreen's. The grant enabled us to fund a new Breast Patient Navigator, Carrie Galloway. With the additional help of the Cancer Center's Hispanic Navigator, Maria Alejandra Combs, all new breast cancer patients receive assistance in navigation.

The Breast Cancer Survivor's Clinic in Clemmons is thriving. More than 450 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.

The Breast Care Center hosted the Ninth Annual Breast Cancer Symposium at Wake Forest University's Bridger Field House in September 2015. 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. The Breast Care Center also has a variety of institutional research initiatives that have led to several publications in prestigious journals and presentations at national meetings.

CANCER PREVENTION AND CONTROL RESEARCH PROGRAM

The Cancer Prevention and Control (CPC) Research 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 25 members in 13 departments led by Kristie Foley, PhD, Program Leader and Associate Director for Population Sciences, and Kathryn Weaver, PhD, 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.

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 $6.8 million in extramural cancer-related research funding to achieve these aims.

Some of the major ongoing projects include:

PRIMARY PREVENTION

- Effective Communication on Tobacco Product Risk and FDA Authority
- Implementing Evidence-based Tobacco-cessation Strategies in Oncology Clinics
- The National Coalition Network for Tobacco and Cancer-free Living Centers for Disease
- Building Capacity for Tobacco Research in Romania
- SipSmarter: A Nutrition Literacy Approach to Reducing Sugar-sweetened Beverages
- The Wake Forest Center for Botanical Lipids and Inflammatory Disease Prevention
- Brenner FIT Kohl's Family Collaborative

REDUCING CANCER DISPARITIES

- A Primary Care Multilevel mHealth Colorectal Cancer Screening Intervention
- Evaluation of the Geographic Health Equity Alliance

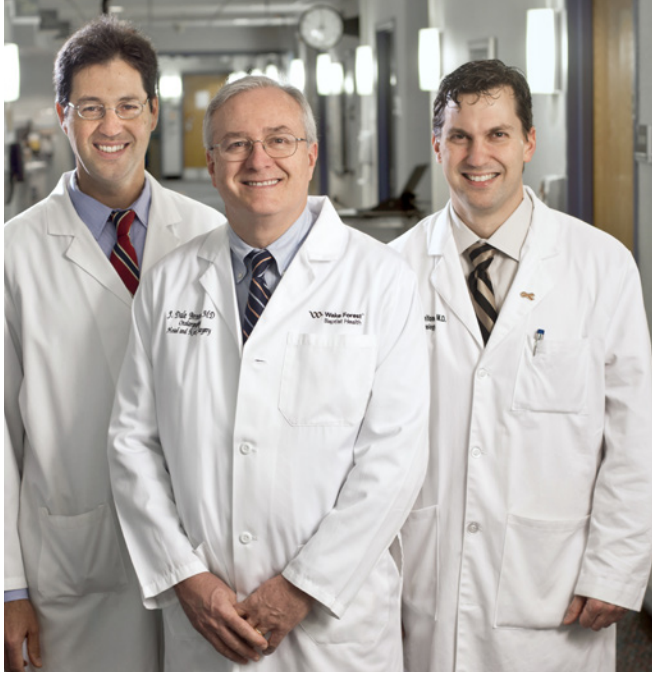
SURVIVORSHIP

- A Prospective Study of the Impact of Breast Cancer on Symptoms and Functioning
- Reducing Lung Cancer Survivor Anxiety with Brief Device-guided Breathing
- Acupuncture in the Treatment of Hot Flashes
- Preventing Anthracycline Cardiovascular toxicity with Statins
- Early Imaging Detection of CV Injury After Cancer
- Understanding and Predicting Fatigue, CV Decline & 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
- End of Treatment Transition to Follow-up Care Among Early Stage Lung Cancer Survivors

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 2014, 429 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 represents a large incidence of oral cavity and oropharyngeal tumors, as well as laryngeal cancers treated relative to national incidence figures. 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: 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: 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 consultive 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.

more than

4,222

new patient encounters

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 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. In 2015, a multidisciplinary Precision Oncology program was begun to 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. During the 2014–2015 academic year, this group accounted for a total of 4,222 new patient encounters and 88,837 return and outpatient treatment visits. In 2015, the marrow transplant service provided 119 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

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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 Baptist that 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 2014–2015, Section members enrolled almost 1,000 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 12 to 20 new patients with this diagnosis are evaluated and treated annually at the Eye Center. Previously, intraocular melanomas were treated by enucleation, removal of the eye. Although some melanomas still need to be treated by this modality, many 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 shrink it. This procedure is performed by Craig Greven MD, in conjunction with the Department of Radiation Oncology. Also, transpupillary thermotherapy is a new laser procedure that can be used to treat melanomas of the choroid.

Tumors of the eyelids and orbit are managed by Patrick YYeatts, MD, and Molly Fuller, MD, 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 and Otolaryngology, 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 Matthew Giegengack, MD, 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 an 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 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 general 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 400 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 endoprostheses, allograft utilization, and free vascularized bone and tissue transfers — are often performed. They have allowed 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. Current 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.

A special effort is made to see all new tumor patients within one week, and most can be seen within 24 to 48 hours for urgent referrals.

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 five pediatric hematologists/oncologists: Marcia Wofford, MD, Tom McLean, MD, Natalia Dixon, MD, Kevin Buckley, MD, and Thomas Russell, MD. It has four pediatric nurse practitioners, a physician's assistant, a doctor 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, 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.

There is a dedicated, long-term follow-up program with a focus on education and cancer control for adolescent and young adult survivors. 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 active and off-therapy patients and families. The CCSP conducts a support group for adolescents and 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. Wofford, the former section chief, is now Associate Dean for Student Affairs for Wake Forest School of Medicine. She continues to practice pediatric hematology/oncology. Dr. 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. 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. Buckley's interests include general pediatric hematology/ oncology, infections in immunocompromised populations and immune reconstitution after non-myeloablative chemotherapy. In addition to pediatric hematology/ oncology, Dr. Buckley is also board certified in pediatric infectious diseases. Dr. 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. 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.

PHARMACY

The Pharmacy Department combines clinical, educational and research missions in its services to patients and the Cancer Program. Pharmacists and pharmacy technicians are involved in ensuring safe medication-related transitions of care through medication reconciliation and patient education. Pharmacists optimize pharmaceutical care through active participation on the patient care team. The team in 2015 prepared more than 33,000 doses of intravenous chemotherapy across both inpatient and outpatient care areas.

The Wake Forest Baptist Health Pharmacy and Specialty Pharmacy 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 30,000 prescriptions were dispensed in the Cancer Center community pharmacy in 2015, with over 1,600 prescriptions for oral chemotherapy. The pharmacy team works with insurance companies to minimize the time from physician prescribing to delivery to the patient.

Fulfilling its educational 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.

As part of its research mission, the Pharmacy Department provides oversight of investigational studies through protocol review and research committee participation. Pharmacy operations ensure proper storage and preparation of investigational agents. Pharmacy residents, pharmacy students and clinical pharmacists present research projects at regional and national professional meetings.

The Pharmacy Department is a global leader in adoption of automated intravenous medication preparation through its partnership with Loccioni. Since 2012, more than 20,000 doses have been compounded on the Italian-made 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 created, leveraging the same safety tools as the robot. Over the last year greater than 80 percent of all chemotherapy was made on the APOTECA platform. Eventually, all chemotherapy will be made and tracked on one coordinated system, globally a first of its kind.

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.

- BestHealth: Breast Navigation
- St. Andrew's Presbyterian Church Health Fair: Breast Navigation
- Hispanic Latino Community Education and Outreach Panel Discussion: Discussion concerning end-of-life care and advance care planning
- Stand Up To Cancer
- 9th Annual Breast Cancer Symposium
- Susan G. Komen Race for the Cure
- Pink Ribbons Talk: Cancer Services
- Health Fair: UNCG: Employee Wellness Expo
- BestHealth: Good Nutrition for Your Shopping Basket
- "Benign and Malignant Breast Disease": A talk given at the Arbor Acres Retirement Community
- BestHealth: Assess Your Cancer Risks
- Gospel Light Baptist Church: Breast Navigation
- Mt. Zion Baptist Church: Breast Navigation
- Oracle Employee Health Fair
- BestHealth: Gluten-free Diets: When Are They Appropriate?
- BestHealth: BMI Screening
- BestHealth: Preventing Colon Cancer
- Bowman Gray Stadium: Breast Navigation
- RockTenn Employee Expo
- Community Health Day at Lexington Medical Center
- Teaming Up Against Breast Cancer: African-American women of all ages hear from experts sharing about screening and prevention and from breast cancer survivors.
- Piedmont Triad Airport: Breast Navigation
- William Sims Center: Breast Navigation
- BestHealth: Skin Cancer Prevention
- National General Wellness Fair
- Wake Forest School of Medicine: Share the Health Fair
- ACS–Road Rally: Volunteers donate their time and use of their vehicle to transport patients to their cancer treatments
- Pink Night Basketball Game
- Davie Medical Center: Breast Navigation
- Winterlark fundraiser
- "Breast Disease 101": A talk given to Year 2 medical students' women's health block
- "What you need to know about breast disease": A talk given to OB/Gyn grand rounds
- Lung Cancer Screening: A talk to community practices
- Get Your Rear in Gear
- "Colon and Rectal Cancer: Know Your History, Change Your Risks": A talk given at Davie Medical Center
- 6th Annual Clemmons Community Day
- Cancer Services' Wrapped Up in Ribbons
- Komen Hispanic Community Outreach: Hispanic Clinical Trial Navigator
- "Colon and Rectal Cancer": A talk given at Lexington Medical Center
- Cancer Recovery Skills Group Class
- Inmar Health Fair
- ACS Relay for Life
- "Skin Cancer: Diagnosis and Prevention": A talk given in Sticht Center Auditorium
- Free Skin Cancer Screening
- 24th Annual Cancer Survivors Day 2015 ": Celebration of Life"
- Lung Cancer Initiative of NC: A Network of Hope and Action

more than

$640,000

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 completed the program.

Clinical and basic research activities are supported with NIH/NCI grants, foundation/society grants and industry grants totaling $640,000. 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. 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.

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 35 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 4,600 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 the 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 3,400 patients, saw more than 5,400 in follow-up and treated more than 2,750 with external beam radiation therapy and more than 700 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 has two programs designed to address the emotional needs of patients and family members. The unique integration of psychosocial support and counseling services into the Hematology and Oncology Clinic distinguishes the Cancer Center from many others in the nation and strengthens the capability to provide multidimensional care. Such an integrative model allows for interdisciplinary collaboration and the delivery of mental health services in conjunction with medical care. The CPSP/POP is woven into the Supportive Care and Survivorship Services Network at Wake Forest Baptist, which makes available a variety of integrative medicine services for patients and family members.

PSYCHOSOCIAL ONCOLOGY SERVICES

The Cancer Patient Support Program (CPSP)

The mission of the Cancer Patient Support Program is to provide social support for cancer survivors and family members with the goal of enhancing quality of life during the diagnosis and treatment process. Services from this program are provided at no charge to the patient and family members.

There are six full-time equivalent staff members and about 30 weekly core volunteers who provide a variety of services in the clinic and hospital. Services delivered by professional staff include individual and family counseling, inpatient consultation/liaison work, music/harp therapy, new patient survivorship orientation and educational groups, and education and training for staff at Wake Forest Baptist. The CPSP also supports inpatient therapeutic massage on a referral basis and assists with financial and temporary housing support for patients in need.

Volunteers are active in hospital visitation and providing hospitality and refreshments in the Hematology and Oncology and Radiation Oncology clinics. These core volunteers are supported by another group of about 80 community volunteers who are active in the annual Winterlark fundraiser, the annual Survivor's Day Celebration and numerous celebration activities throughout the year.

The Psychosocial Oncology Program (POP)

The Psychosocial Oncology Program began as the Psychological Services arm of the Cancer Center in 1988, with the purpose of providing psychological assessment and counseling for patients and family members suffering from more intense psychological disturbance. Patients often need help with symptom management, including anxiety and depression, family conflict and communication conflicts with the health care team. Additional services include general supportive counseling and specific behavioral procedures, including relaxation training and stress management. This program provides psychological screening and quality-of-life assessment for all bone marrow transplant patients prior to transplantation.

The POP also maintains active research and teaching agendas. Current lines of research focus on fear of cancer recurrence and the long-term quality of life of patients undergoing extreme treatments (such as stem cell transplantation) as well as the variables affecting patients' and caregivers' attitudes toward the completion of advance directives. Staff members publish and present findings at local and national conferences, and look to research findings to inform clinical practice. Teaching activities have included a psychosocial seminar for fellows, lectures to first- and second-year medical students on medicine and psychosocial issues in oncology, and chemotherapy classes within the hospital. The POP is funded through fee-for-service activity and grants.

The Cancer Patient Support and Psychosocial Oncology programs have been designed to meet a wide range of patient needs. Most cancer patients and their families do not need intensive psychosocial care, but rather supportive services provided through volunteers and professional counselors. CPSP and POP are positioned to take care of intensely disturbed patients as well as those proceeding through a "normal" crisis during diagnosis and treatment. Studies conducted in our outpatient clinic have shown that a new cancer diagnosis is extremely distressing, yet can be modified by a simple orientation procedure.

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The CPSP and POP programs represent unique offerings within the administrative structure of the Cancer Center and Section of Hematology and Oncology. The CPSP/POP and Supportive Care and Survivorship Services Network at WFBH make available a variety of services including massage therapy, psychiatry, social work, pastoral care and others. Because both the CPSP and POP are located within Cancer Center clinics (Hematology and Oncology, radiation therapy and surgery), they are highly visible and well received. The CPSP and POP continue to help patients and family members maintain quality of life during and after treatment.

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 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 CompRehab.
- **Meditation Room**: Located on the second floor of the outpatient Cancer Center, this room is set aside for quiet meditation or prayer.
- **Mindfulness-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:** 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:** 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.

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 and 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 a specialty 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 4 patients per week.

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 approximately 1,500 major operative cases and more than 8,000 outpatient visits per year.

The clinical service includes seven 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, Jennifer Cannon, MD, and Clancy Clark, MD, serve as the clinical faculty. Specialized advanced nurses support the breast care clinic, inpatient surgical oncology and gastrointestinal tumor care. The clinical research effort is supported by two research nurses and two full-time data managers.

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 more than 350 new breast cancer cases evaluated in 2015. 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. Additionally, we have broadened our long-term survivor clinics for breast cancer.

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

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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. Votanopoulos continues his efforts to bring surgical oncology expertise beyond the main campus. He leads the General Surgery effort at the VA – Salisbury, while maintaining an 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, and recently completed his PhD, as well.

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 about 100 HIPEC cases annually, with more than 1,250 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.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. Dr. Levine was recently awarded a research grant from the National Organization for Rare Diseases (NORD) to continue the lead groundbreaking research into the genetics of cancer of the appendix, which commonly benefits from therapy with HIPEC.

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, 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 weekly on Tuesdays at noon. On Sept. 25, 2015 Surgical Oncology sponsored its 10th annual breast cancer symposium, and on October 23, 2015, ran a well-attended HPB conference.

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 and Eastern Virginia University). 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 last year and our fellowship is now fully accredited (one of only 23 programs in North America so honored).

Surgical Oncology holds more than

$500,000

in active extramural funding

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 Cancer Center, including Public Health Sciences, Exercise Physiology, Gastroenterology, Cancer Biology, Radiology, Nuclear Medicine, and Medical and Radiation Oncology. In 2015, Surgical Oncology enrolled nearly 300 patients on treatment protocols and more than 1,750 on tissue-procurement studies. The surgical oncology faculty had a total of 27 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 "fit bit" data for predicting outcomes for older patients undergoing major cancer surgery. Dr. Howard-McNatt published research this year evaluating the impact of genetic testing for familial breast cancer on surgical decision-making.

These efforts led to the publication of 12 peer-reviewed manuscripts in 2015, as well as 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 fours 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 2015, 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 the 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.

2014 CANCER DATA

2014 CANCER REGISTRY DATABASE

TOTAL CASES*	NUMBER	PERCENT
Lung	582	12.1
Breast	457	9.5
Colorectal	364	7.5
Oral cavity, pharynx	298	6.2
Melanoma of skin	283	5.9
Prostate	282	5.8
Leukemia	274	5.7
Brain, CNS	245	5.1
NH Lymphoma	199	4.1
Kidney, renal pelvis	173	3.6
Pancreas	160	3.3
Thyroid	130	2.7
Bladder	123	2.5
Uterus	96	2
Connective tissue	87	1.8
Multiple myeloma	86	1.8
CMPD, MDS	83	1.7
Stomach	82	1.7
Esophagus	79	1.6
Liver	74	1.5
Larynx	71	1.5
Other female	58	1.2
Other endocrine	55	1.1
Ovary	54	1.1
Unknown primary	52	1.1
Small intestine	38	0.8
Mets SCCa/BCCa	36	0.7
Cervix	35	0.7
Anus, anal canal	31	0.6
Bone	30	0.6
Other skin	29	0.6
Gallbladder, biliary	28	0.6
Nasal, sinus	27	0.6
Hodgkins disease	26	0.5
Eye	24	0.5
Retroperitoneum	22	0.5
Other urinary	18	0.4
Other digestive	11	0.2
Other male	7	0.1
Testis	6	0.1
Ill-defined	4	0.1
Pleura, Med, Heart	4	0.1
Peripheral nerves	4	0.1
Thymus	3	0.1
Total Cases	**4,830**	**100**

GENDER	NUMBER	PERCENT
Male	2,497	51.7
Female	2,333	48.3
RACE		
White	4,167	86.3
Black	576	11.9
Other	87	1.8
ETHNICITY—HISPANIC		
Male	36	0.7
Female	60	1.2
CLASS OF CASE		
Analytic/new dx	3,874	80.2
Non-analytic/recurr	455	9.4
Consults, dx workup	501	10.4
RESIDENCE		
North Carolina	4,025	83.3
Other states in USA	802	16.6
Outside of USA	3	0.06
PATIENT HISTORY		
Family History	3,041	63
Tobacco History	2,896	60
cigarette	888	
cigar/pipe	15	
snuff/chew/smokeless	117	
combination use	29	
previous use	1,847	
Alcohol History (2 or more drinks/day)	556	11.5
current use	372	
past history	184	
PRIMARY NEOPLASMS		
One primary only	3,464	71.7
First of two primaries	181	3.7
Second primary	748	15.5
Third primary	148	3.1
Fourth primary	20	0.4
Fifth primary	9	0.2
Sixth primary	3	0.1
Benign neoplasms	257	5.3

*Includes maligant, in-situ, selected benign cases; newly diagnosed, recurrent and consult cases

COMPARISON OF 2014 WFBMC, STATE AND NATIONAL DATA

	WFBMC		NORTH CAROLINA		USA	
PRIMARY SITE	CASES	PERCENT	CASES	PERCENT	CASES	PERCENT
Lung	487	14.4	8,624	15.1	224,210	13.5
Breast	331	9.8	7,898	13.8	235,030	14.1
Colorectal	246	7.3	4,746	8.3	136,830	8.2
Oral cavity, pharynx	209	6.2	1,419	2.5	42,440	2.5
Prostate	208	6.1	8,399	14.7	233,000	14
Leukemia	204	6	1,378	2.4	52,380	3.1
Melanoma of skin	187	5.5	2,482	4.3	76,100	4.6
Kidney, renal pelvis	147	4.3	1,942	3.4	63,920	3.8
Pancreas	138	4.1	1,354	2.4	46,420	2.8
NH Lymphoma	138	4.1	2,120	3.7	70,800	4.3
Thyroid	116	3.4	1,308	2.3	62,980	3.8
Uterus	89	2.6	1,509	2.6	52,630	3.2
Bladder	87	2.6	2,402	4.2	74,690	4.5
Brain, CNS	76	2.2	718	1.3	23,380	1.4
Soft Tissue	74	2.2	375	0.7	12,020	0.7
Stomach	63	1.9	720	1.3	22,220	1.3
Liver, bile ducts	62	1.8	767	1.3	33,190	2
Larynx	60	1.8	533	0.9	12,630	0.8
Multiple myeloma	53	1.6	805	1.4	24,050	1.4
Esophagus	46	1.4	548	1	18,170	1.1
Ovary	33	1	724	1.3	21,980	1.3
Small intestine	30	0.9	300	0.5	9,160	0.6
Cervix	25	0.7	380	0.7	12,360	0.7
All Others	313	9.2	5,847	10.2	104,950	6.3
Total Cases	**3,392**	**100**	**57,298**	**100**	**1,665,540**	**100**

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 consultations.

WFBMC–exact figures
NC–estimated numbers from NC-Central Cancer Registry Facts and Figures 2014
USA–estimated numbers from American Cancer Society Cancer Facts and Figures 2014

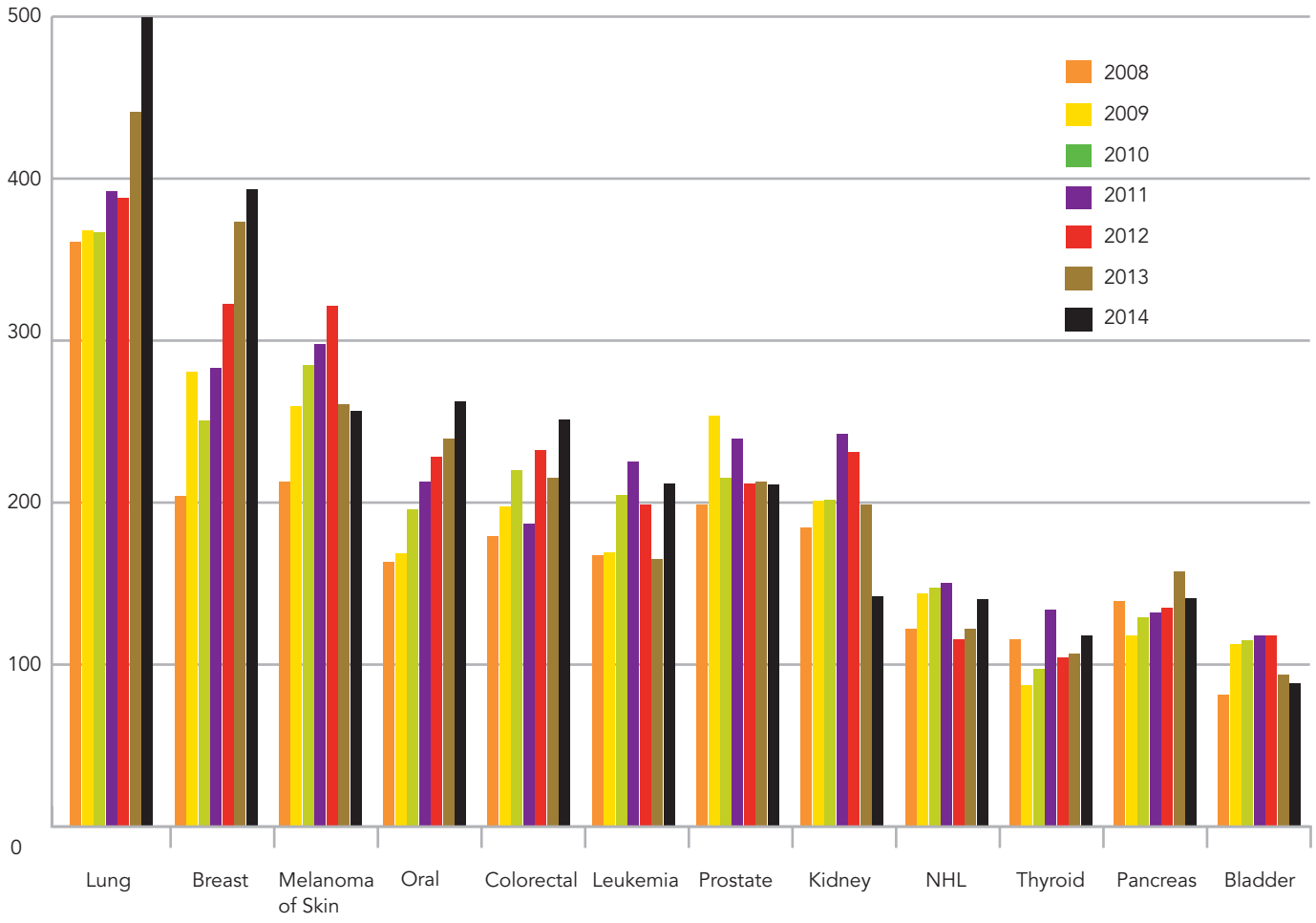
PRIMARY SITE DISTRIBUTION 2014

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	**4,830**	**3,874**	**455**	**501**	**2,161**	**2,006**	**290**	**286**	**46**	**41**	**36**	**60**
Oral cavity, pharynx	**298**	**259**	**17**	**22**	**179**	**92**	**15**	**8**	**3**	**1**	**0**	**1**
lip	12	10	2	0	7	5	0	0	0	0	0	0
tongue	74	61	9	4	51	17	4	0	2	0	0	0
gum	12	12	0	0	3	7	1	1	0	0	0	0
floor of mouth	20	19	0	1	14	4	1	0	1	0	0	0
palate	16	15	0	1	7	9	0	0	0	0	0	0
other mouth	23	22	1	0	10	11	1	1	0	0	0	0
salivary, malignant	23	18	1	4	13	7	1	2	0	0	0	0
salivary, benign	41	41	0	0	15	23	0	2	0	1	0	1
tonsil	42	33	3	6	33	5	3	1	0	0	0	0
oropharynx	13	8	0	5	13	0	0	0	0	0	0	0
nasopharynx	4	3	0	1	2	2	0	0	0	0	0	0
pyriform sinus	2	2	0	0	2	0	0	0	0	0	0	0
hypopharynx	12	11	1	0	7	1	4	0	0	0	0	0
other oral cavity	4	4	0	0	2	1	0	1	0	0	0	0
Digestive system	**867**	**659**	**83**	**125**	**429**	**300**	**62**	**54**	**15**	**7**	**9**	**14**
esophagus	79	56	4	19	65	7	2	3	2	0	1	0
stomach	82	63	3	16	40	27	6	7	0	2	0	5
s intestine	38	30	3	5	22	11	3	2	0	0	0	1
colon	241	150	50	41	102	98	19	17	3	2	2	2
rectosigmoid	13	13	0	0	7	4	1	0	1	0	1	0
rectum	110	85	6	19	50	43	5	7	4	1	1	1
anus/anal canal	31	27	2	2	12	9	8	2	0	0	1	0
liver	74	62	10	2	42	25	3	4	0	0	2	1
gallbladder	8	6	0	2	6	0	1	1	0	0	0	0
biliary	20	18	1	1	10	4	3	0	3	0	1	0
pancreas	160	139	4	17	70	64	11	11	2	2	0	2
other digestive	11	10	0	1	3	8	0	0	0	0	0	2
Respiratory sys	**683**	**577**	**50**	**56**	**335**	**241**	**56**	**38**	**7**	**6**	**5**	**2**
nasal cavity	17	14	1	2	9	6	0	2	0	0	0	0
sinuses	10	7	2	1	5	4	1	0	0	0	0	0
larynx	71	61	6	4	46	8	10	5	2	0	2	0
lung-non small	506	429	31	46	239	188	41	27	5	6	3	2
lung-small cell	76	64	9	3	35	34	3	4	0	0	0	0
thymus	3	2	1	0	1	1	1	0	0	0	0	0
Pleura/Med/Heart	**4**	**4**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Bone	**30**	**28**	**0**	**2**	**8**	**17**	**4**	**1**	**0**	**0**	**0**	**0**
Hematopoietic system	**443**	**295**	**52**	**96**	**231**	**153**	**28**	**25**	**3**	**3**	**6**	**11**
multiple myeloma	86	53	10	23	41	25	11	8	1	0	1	1
lymphoid leukemia	90	64	13	13	51	29	4	4	1	1	5	4
myeloid leukemia	172	141	13	18	88	69	7	8	0	0	0	6
other leukemia	12	4	3	5	7	4	1	0	0	0	0	0
CMPD, MDS	83	33	13	37	44	26	5	5	1	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	**348**	**303**	**28**	**17**	**210**	**130**	**5**	**3**	**0**	**0**	**0**	**0**
melanoma	283	253	15	15	165	116	1	1	0	0	0	0
other skin	29	27	1	1	17	6	4	2	0	0	0	0
mets SCCa/BCCa	36	23	12	1	28	8	0	0	0	0	0	0
Peripheral Nerves	**4**	**3**	**0**	**1**	**2**	**1**	**0**	**1**	**0**	**0**	**0**	**0**
Retroperitoneum	**22**	**17**	**3**	**2**	**9**	**9**	**2**	**2**	**0**	**0**	**0**	**0**
Connective tissue	**87**	**74**	**5**	**8**	**49**	**30**	**3**	**3**	**1**	**1**	**2**	**4**
Breast	**457**	**388**	**29**	**40**	**7**	**364**	**1**	**74**	**0**	**11**	**0**	**14**
Female genital sys	**243**	**219**	**16**	**8**	**0**	**210**	**0**	**27**	**0**	**6**	**0**	**7**
vulva	46	44	2	0	0	38	0	7	0	1	0	0
vagina	5	4	0	1	0	5	0	0	0	0	0	0
cervix	35	31	1	3	0	29	0	4	0	2	0	2
uterus	96	89	6	1	0	83	0	11	0	2	0	1
ovary, malignant	42	33	6	3	0	38	0	3	0	1	0	0
ovary, borderline	12	12	0	0	0	10	0	2	0	0	0	2
other female	7	6	1	0	0	7	0	0	0	0	0	2
Male genital sys	**295**	**219**	**44**	**32**	**232**	**0**	**57**	**0**	**6**	**0**	**6**	**0**
penis	5	5	0	0	5	0	0	0	0	0	0	0
prostate	282	208	43	31	219	0	57	0	6	0	6	0
testis	6	4	1	1	6	0	0	0	0	0	0	0
other male	2	2	0	0	2	0	0	0	0	0	0	0
Urinary system	**314**	**251**	**51**	**12**	**191**	**78**	**23**	**16**	**6**	**0**	**4**	**0**
kidney	160	140	17	3	83	54	9	12	2	0	2	0
renal pelvis	13	9	3	1	8	2	2	1	0	0	0	0
ureter	8	6	2	0	6	1	1	0	0	0	0	0
bladder	123	87	29	7	86	19	11	3	4	0	2	0
other urinary	10	9	0	1	8	2	0	0	0	0	0	0
Eye	**24**	**19**	**1**	**4**	**9**	**15**	**0**	**0**	**0**	**0**	**0**	**0**
Brain, CNS	**245**	**206**	**19**	**20**	**89**	**138**	**8**	**6**	**2**	**2**	**1**	**1**
brain, malignant	93	76	3	14	49	38	2	3	1	0	1	0
brain, benign	152	130	16	6	40	100	6	3	1	2	0	1
Thyroid/Endocrine	**185**	**162**	**16**	**7**	**54**	**105**	**9**	**13**	**1**	**3**	**1**	**3**
thyroid	130	116	10	4	28	84	4	12	0	2	0	3
adrenal	3	1	1	1	0	3	0	0	0	0	0	0
other malignant	0	0	0	0	0	0	0	0	0	0	0	0
other benign	52	45	5	2	26	18	5	1	1	1	1	0
Lymphoma	**225**	**152**	**40**	**33**	**105**	**93**	**14**	**10**	**2**	**1**	**1**	**3**
NHL	199	138	35	26	93	86	10	7	2	1	1	3
Hodgkins	26	14	5	7	12	7	4	3	0	0	0	0
Unknown Primary	**52**	**37**	**1**	**14**	**17**	**28**	**2**	**5**	**0**	**0**	**0**	**0**
Ill-defined	**4**	**2**	**0**	**2**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**

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

COMPARISON OF WFBMC MOST PREVALENT SITES BY YEAR newly diagnosed cases



2015

PUBLISHED ABSTRACTS

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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