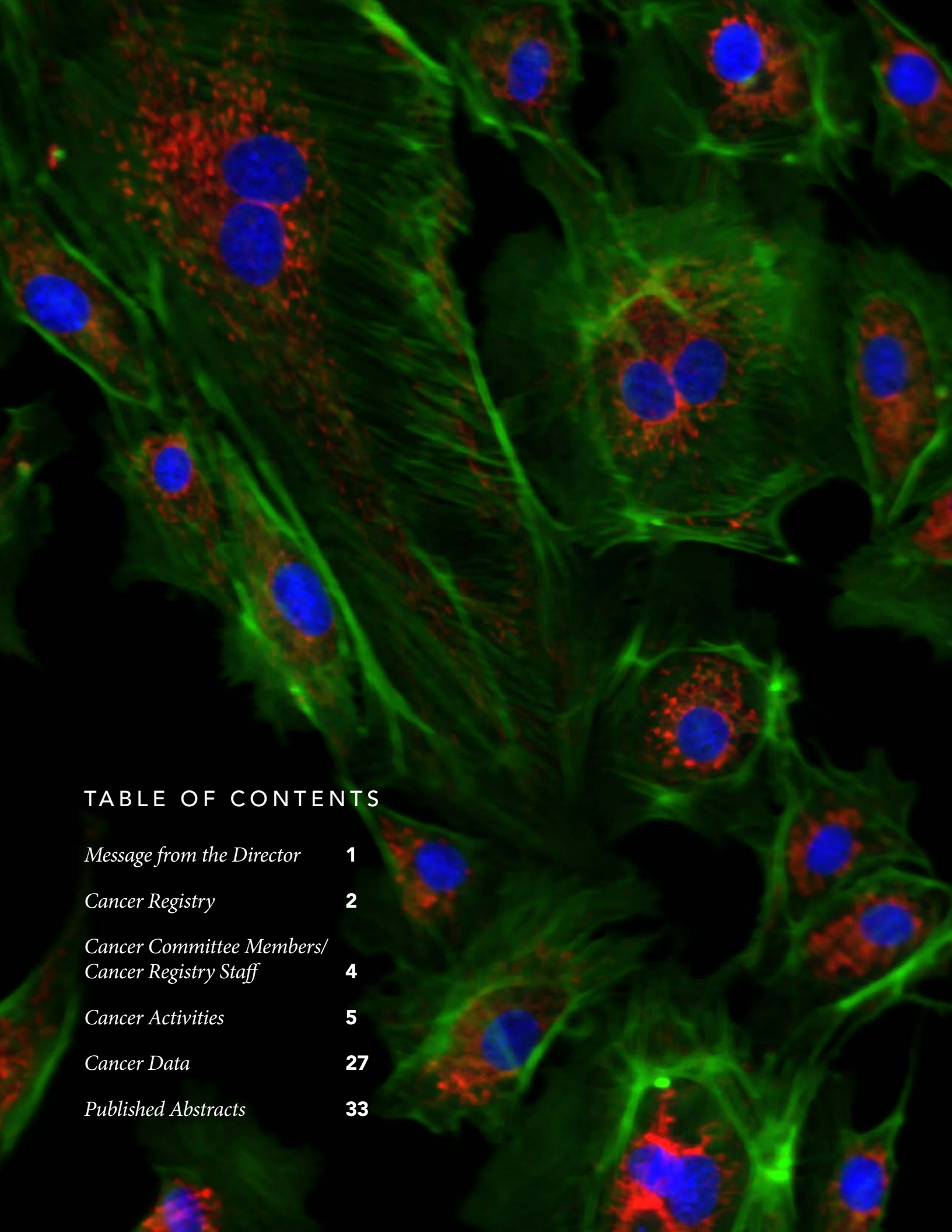
Wake Forest®
Baptist Health

2017 CANCER PROGRAM

Annual Report with 2016 statistics



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"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 / Director, Comprehensive Cancer Center

COMPREHENSIVE CANCER CENTER

AT WAKE FOREST BAPTIST MEDICAL CENTER

The Wake Forest Baptist Comprehensive Cancer Center is among a distinguished group of cancer centers acknowledged as the nation's leaders in the fight against cancer. Established in the early 1960s, our Center became a National Cancer Institute (NCI)-designated cancer center in 1974. Demonstrating its continued commitment to excellence, the Center received the additional NCI designation as a "Comprehensive" Cancer Center in 1990. It is currently recognized as one of only 49 comprehensive cancer centers in the nation.

Our mission is to reduce cancer incidence, morbidity, and mortality in the catchment area, nationally, and internationally through cutting-edge research and treatments, education and outreach, and multi-disciplinary training. Our catchment area, which is predominantly rural, includes the Piedmont and southern Appalachian region, an area of 58 contiguous counties in North Carolina, Virginia, West Virginia and Tennessee.

The region we serve has significant health disparity issues as compared to national averages for cancer incidence and mortality. To target these issues, we conduct cutting-edge basic, clinical, and population research on the prevention, detection and treatment of cancer, translating this knowledge into strategies to improve patient outcomes and reduce the incidence of cancer. Our Cancer Center established an Office of Cancer Health Equity in 2014 that is focused on conducting culturally relevant navigation and ongoing community outreach and engagement opportunities, as well as providing education and resources to patients throughout our catchment area.

Recognized in the region for both our advanced technology and our nationally and internationally renowned experts, the Comprehensive Cancer Center is comprised of 141 faculty members from 35 departments who conduct diverse and translational research across the Center's four programs: Cancer Prevention and Control, Tumor Progression and Recurrence, Cancer Biology and Biochemistry, and Clinical Research. We also provides specialized treatment through 13 disease-oriented and thematic teams: brain (neuro-oncology), breast, cancer survivorship and control, gastrointestinal, gynecological, head and neck, hematologic malignancies, lung, melanoma, pediatric oncology, phase I and precision oncology and sarcoma.

We are committed to building interdepartmental and transdisciplinary research teams, continuing to excel in research excellence while serving as the main tertiary referral Center for the catchment area. Strong collaborations have been established with other Wake Forest entities, such as the Clinical and Translational Science Institute, the Center for Precision Medicine, the Sticht Center for Healthy Aging and Alzheimer's Prevention, the Institute for Regenerative Medicine, the Maya Angelou Center for Health Equity, and the Virginia Tech-Wake Forest University School of Biomedical Engineering and Science. Collaborations among research faculty conducting laboratory science and clinical researchers ensure that our patients are offered novel therapies and fast access to advanced cancer care.

With more than 200 clinical trials offered to patients each year, the Center provides more cancer-related clinical trials than any other hospital in western North Carolina. These trials are of vital importance to our catchment area, providing the opportunity for patients to have access to some of the newest therapies, prevention techniques, and survivorship strategies. Patients receive treatment in our state-of-the-art facility, an 11-story cancer hospital that houses all inpatient and outpatient clinical services, an oncology intensive care unit, an outpatient pharmacy, imaging, cancer patient support services and more. Having all services related to a patient's cancer journey in one building provides an exceptional environment for patients, family members and caregivers.

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 manages and analyzes 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.

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. The Cancer Registry collects the cancer data if patients are seen at the following locations:

» Wake Forest Baptist Medical Center (main campus)

» Provider-based clinics (Lexington, Elkin, and Mount Airy)

» Lexington Medical Center

» Statesville practice

» Medical Plaza–Clemmons

» Davie Medical Center

» Wilkes Medical Center

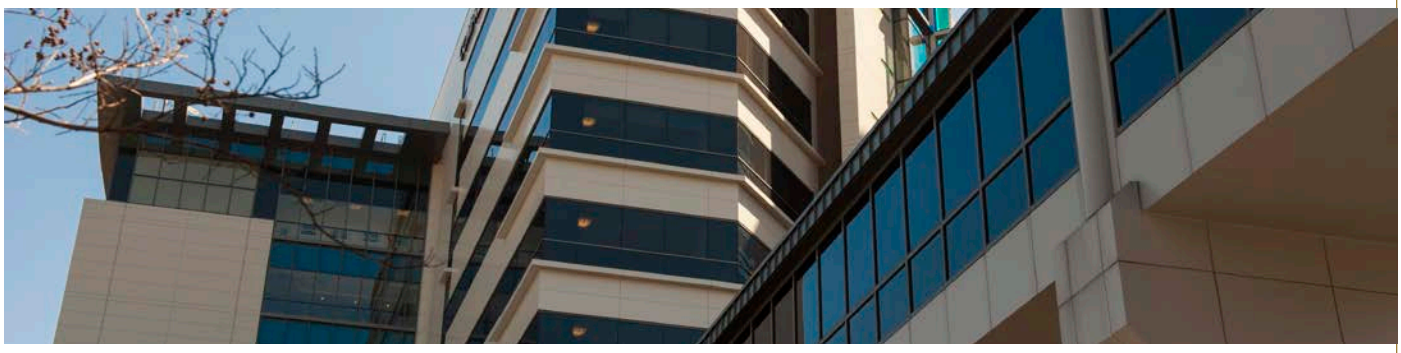
In 2016, the Cancer Registry began participation in the American College of Surgeons' Rapid Quality Reporting System (RQRS). RQRS is a reporting and quality improvement tool which provides real clinical time assessment of hospital level adherence to quality of cancer care measures. The American College of Surgeons requires only the submission of breast, colon and rectal cancer cases. Submission of all sites will be required by 2020.

The Cancer Registry manages and analyzes clinical cancer information for the purpose of education, research, and outcome measurement.

Lifelong 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 cancer primary site. 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 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 OCNs 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.

CONTINUED

CANCER COMMITTEE MEMBERS

Edward Levine, MD, Chair \ Surgical Oncology

Wendy Cox \ Operational Coordinator, Cancer Center, Nursing Administration

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 \ Cancer Patient Support Program

Judith Messura, DMD \ Dentistry

Reggie Munden, MD, DMD, MBA \ Interim VP Cancer Services

Stacey S. O'Neill, MD, PhD \ Pathology

Amy Pace, MSW \ Care Coordination

William Jeff Petty, MD \ Hematology and Oncology

Susan Poindexter, BSN, RN \ Nursing Education Coordinator, Hematology and Oncology

Brandy Strickland Synder, PharmD \ Pharmacy, Oncology Service Line

Rebecca Rankin\Director of Administration, Comprehensive Cancer Center

Carolyn Scott, DNP, MBA, RN, NEA-BC \ Chief Nursing Officer, Comprehensive Cancer Center

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

Jenean Burris, RHIT, CTR \ Oncology Data Analyst

Cindy McAlpin, BA, CTR \ Oncology Data Analyst

Tammie Miller, RRT, CTR \ Oncology Data Analyst

Pamela Childress-Obenauf, BA, CTR \ Oncology Data Analyst

Kimberly Ortiz, BS, CTR \ Oncology Data Analyst

Shawnetta Peebles, RHIT, CTR \ Oncology Data Analyst

Michael Serwint, MD, CTR \ Oncology Data Analyst

Querube Storti, RRT, CTR \ Oncology Data Analyst

Terri Swan, CTR \ Oncology Data Analyst

2017 CANCER ACTIVITIES

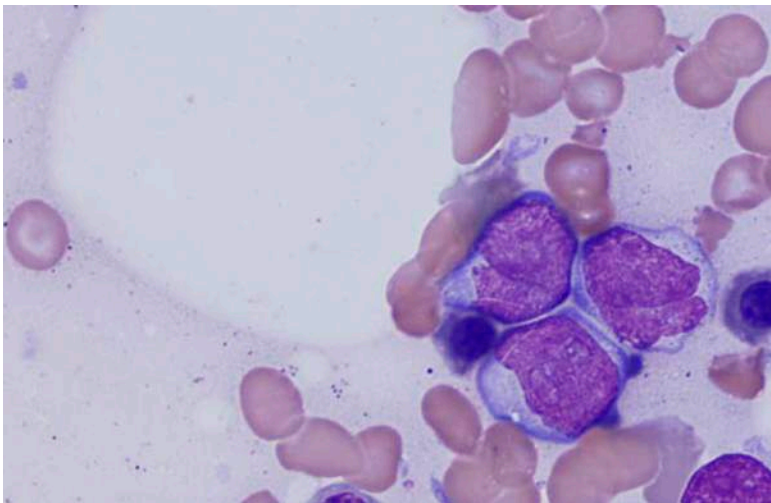
The BMT Program is a multidisciplinary team that includes physicians, advanced practice providers, pharmacists, nurse coordinators, financial coordinators, a psychologist, social workers, nurses, a dietitian, physical therapists, the stem cell processing team, the apheresis team and HLA tissue-typing specialists.

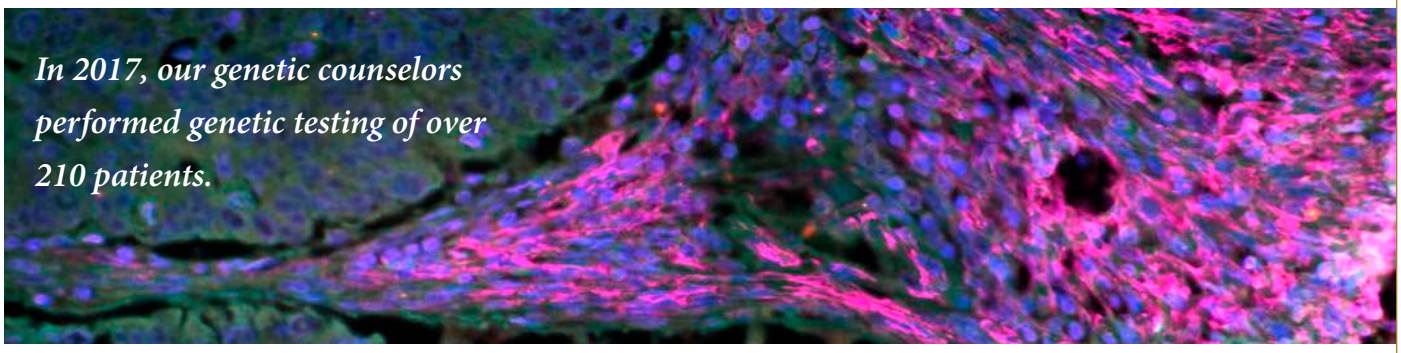
BLOOD AND MARROW TRANSPLANT PROGRAM

The Blood and Marrow Transplant Program has transplanted more than 2,200 patients since the first transplant was performed in May 1990 and serves patients from the Piedmont region and surrounding states. In 2017, 105 patients with a spectrum of hematologic malignancies and diseases of the bone marrow received transplants including autologous or allogeneic transplants. Patients also received cellular therapy interventions including donor lymphocyte infusions to counter relapsed disease and stem cell re-infusions to treat graft rejection. There has been tremendous growth in the BMT Program by offering transplants to patients who in the past would not be able to proceed to transplant due to age or lack of a matched HLA donor. The oldest patient transplanted in 2017 was 78 years old, and this transplant was accomplished through a partnership between the BMT Program and Physical Medicine and Rehabilitation Services before the actual surgery to identify the post-transplant needs for patients older than 65 years old. Patients who do not have a matched HLA donor now may be able to proceed with transplant if a haplo-identical related donor is available. Autologous transplants provided in the Outpatient Transplant Program expanded beyond myeloma to include patients with lymphoma. This would not have been possible without the partnership from nursing, pharmacy and BMT nurse coordinators. Data shows that providing transplants in the outpatient setting improves quality of the experience and decreases the overall financial burden of care.

The BMT Program is a multidisciplinary team that includes physicians, advanced practice providers, pharmacists, nurse coordinators, financial coordinators, a psychologist, social workers, nurses, a dietitian, physical therapists, the stem cell processing team, the apheresis team, and HLA tissue-typing specialists. The BMT physicians work with collaborators throughout the institution to provide clinical trials to optimize transplant outcomes through post-transplant therapies to suppress disease recurrence, develop novel therapeutics fore relapsed and refractory hematologic malignancies, expand protocols to treat graft versus host disease (GVHD), create protocols to measure treatment toxicities, and develop interventions to mitigate the toxic effects of chemotherapy. The BMT pharmacists were recognized by American Society Hospital Pharmacists with a Best Practice Award for excellence and innovation for their work in the Outpatient Transplant Program.

The BMT Program is accredited by the Foundation of Accreditation of Cellular Therapy and maintains a quality management plan that monitors and measures all aspects of bone and marrow transplant. The BMT Program performance and quality metrics have allowed the BMT Program to be included in excellence networks with many of the larger insurer groups. The quality initiatives include building and maintaining community partnerships throughout the institution and state, following BMT survivor health concerns, identifying outcome predictors to assess fitness for transplant in patients older than 65 years old, and increasing patient satisfaction and medication adherence through enhanced education before transplant, during transplant and before discharge.





BREAST CARE CENTER

The multimodality Breast Care Center celebrated its 17th anniversary in January 2017. In 2017, 370 patients were seen with breast cancer in the Breast Care Center. This represents a continued increase in our Center's volumes. 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 along with mammographers, genetic counselors, a radiation oncologist and another oncologist prior to being seen in clinic. Typically, patients are seen by a multidisciplinary group consisting of surgeons, a radiation oncologist, a plastic surgeon, nurse practitioners, a genetic counselor and a medical oncologist, if necessary. For example, our genetic counselors, Anna Villa and Thuy Vu, performed genetic testing in over 210 patients in the Breast Care Center.

Our Breast Care Center surgery team includes two breast surgery trained specialists: Dr. Marissa Howard-McNatt, director of the Center, and Dr. Akiko Chiba, who completed her breast surgery fellowship at the Mayo Clinic. Dr. Edward Levine, the division head and a surgical oncologist, also sees breast cancer patients. Our Medical Oncology team is represented by Dr. Alexandra Thomas, who is the leader of Breast Hematology Oncology. She and Dr. Howard-McNatt are co-leaders of the Breast Disease-Oriented Team. Other breast medical oncologists within Breast Hematology and Oncology include Dr. Susan Melin, Dr. Tiffany Avery, Dr. Katherine Ansley, Dr. Steven Sorscher, and Dr. Heidi Klepin. Dr. Doris Brown heads Breast Radiation Oncology.

The Breast Care Center's 3-D 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. Our mammographers are led by Dr. Nadja Lesko and include Dr. Margaret Yacobozzi, Dr. Megan Lee and Dr. Kelly Cronin.

The Breast Cancer Survivor's Clinic in Clemmons is thriving. More than 450 patients were seen in the 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 monitors these patients, but it also provides in-depth psychosocial and health maintenance to these high-risk women. In combination with the Benign Breast Clinic, a total of 778 patients were seen at the Clemmons location in 2016.

The Breast Care Center hosted the 12th Annual Breast Cancer Symposium in September 2017. 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 NRG Oncology, the Alliance and SWOG. Wake Forest Baptist and Yale University also opened the Shave 2 Study, a multi-institutional randomized control trial of routine shave margins versus 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 during the past year in prestigious journals including *Annuals of Surgical Oncology and JAMA Oncology*. Several presentations were presented at national meetings including the Society of Surgical Oncology Cancer Symposium and the San Antonio Breast Cancer Symposium.

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 patients' 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.

COMMUNITY OUTREACH / PUBLIC EDUCATION

One of the Comprehensive Cancer Center's goals is promoting public awareness of cancer. Our educational programs and activities stress prevention and early detection. The following were highlights of our public awareness program:

- Seasons of Survival – Discussion of medical management, exercise, nutrition, relaxation and stress management techniques.
- Health Fair / Health Screenings / Physician Consults – Prostate information and blood test, lung function, skin cancer screening and BMI
- Breast Health Talk / Hispanic Support Group
- Health Fair at Churches – Distribution of cancer information pamphlets
- Wake Forest Pink Games – WF women's basketball team game plus pre-game activities such as a silent auction of WF sports memorabilia, trivia games, corn-hole tournament, Brenner Children's Hospital jeopardy and an inflatable bounce house. Booths provided health information. Proceeds benefited the Breast Care Center.
- WSSU H.E.R. Health Day – Provided mammogram screening sign up, smoking information and general cancer information to connect women on a path to personal health and wellness.
- Kick Butts Day – Organized by the Campaign for Tobacco-Free Kids. A national day of activism that empowered youth to standout, speak up and seize control against Big Tobacco. Presentations included lung cancer prevention, symptoms and treatment.
- Health & Wellness Series for Colorectal Cancer Prevention and Treatment
- Students Making a Right Turn – Dangers of smoking and secondhand smoke
- BestHealth at Davie Medical Center Open House – Breast and colorectal screening information
- NC Cancer Prevention & Control 10th Annual Cancer Survivorship Summit – Provided survivorship resources and other cancer information.
- Susan G. Komen Northwest NC Race for the Cure Run/Walk – Raised awareness for breast cancer education, research and screening.
- Lung Cancer Initiative of NC: A Network of Hope and Action – presentations included gamma knife, lung cancer with brain metastases, robotic surgery, lung cancer immunotherapy and low dose CT lung cancer screening.
- Seventh Annual Employee Health & Fitness Day
- Relay for Life of Forsyth County of American Cancer Society
- Colon Cancer Coalition Race: Get Your Rear in Gear
- Athena's Run – Educational information and statistics on gynecologic cancer.
- 16th Annual Pink Ribbon Talks: Breast Cancer Survivor Conference
- Breast Cancer Awareness – Importance of screening and testing options
- 4 U Day – Games, make-up, food and information
- LUNGe Forward 5K & 1K Run, Walk & Rally – Proceeds benefited the Lung Cancer Initiative of NC
- Cancer Center Philanthropy Luncheon – Discussed lung cancer and lung cancer screening

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.

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 35 members in 13 departments led by Dr. Kristie Foley, Ph.D, Program Leader and Associate Director for Population Sciences. 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 cancer care delivery and symptom management.

Our Program is also dedicated to reducing cancer disparities across programmatic aims. Program members have been granted more than $9.5M dollars in extramural cancer-related research funding to achieve these aims. Some of the major ongoing projects include:

PRIMARY PREVENTION AND EARLY DETECTION OF CANCER

- 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
- The National Coalition Network for Tobacco and Cancer-free Living Centers for Disease Control and Prevention
- Building Capacity for Tobacco Research in Romania Building Social Networks to Improve Physical Activity and Weight Loss in Latino Parents

SURVIVORSHIP

- Preventing Anthracycline Cardiovascular Toxicity with Statins
- Understanding and Predicting Fatigue, Cardiovascular Decline and Events after Breast Cancer Treatment
- Work Ability in Young Adult Survivors: A Quantitative Investigation
- Prepare to Care: A Supported, Self-management Intervention for Head and Neck Survivors
- Post-doctoral Training in Cancer Survivorship Optimizing Health-Related Quality of Life Measurement in Adolescent and Young Adult Cancer Survivors eHealth Mindful Movement and Breathing to Improve Gynecologic Cancer Surgery Outcomes

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 PUFA-Gene Interactions in Health Disparities Influence of Prostate Cancer Treatment on Work Experience with a Focus on Race and Income

There are strong collaborative relationships with surgical oncology, medical oncology and interventional radiology.

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 2016, Gynecologic Oncology treated over 200 newly diagnosed gynecologic malignancies predominantly diseases of the uterine corpus and ovary. Gynecologic Oncology has a significant role in the management of the gynecologic malignancies in the 19 county service area. This includes outreach clinics in Greensboro, Hickory and Lexington. The gynecologic oncology nurse navigator plays an important role in patient care coordination.

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 radiologists meet regularly to discuss challenging cases.

In September 2017, David Shalowitz, MD, MSHP joined the faculty in Gynecologic Oncology. In addition to clinical gynecologic oncology including minimally invasive surgery, Dr. Shalowitz has major research interests in cancer care delivery and health policy.

The section of Gynecologic Oncology in the department of Obstetrics and Gynecology includes:

» Michael G. Kelly, MD, Associate Professor

» David I Shalowitz, MD, MSHP, Assistant Professor

» Samuel S. Lentz, MD, Professor and Section Head

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, 479 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
- Dentistry Department
- Pathology Department
- Diagnostic Radiology
- Speech and Language Pathology
- Nutrition

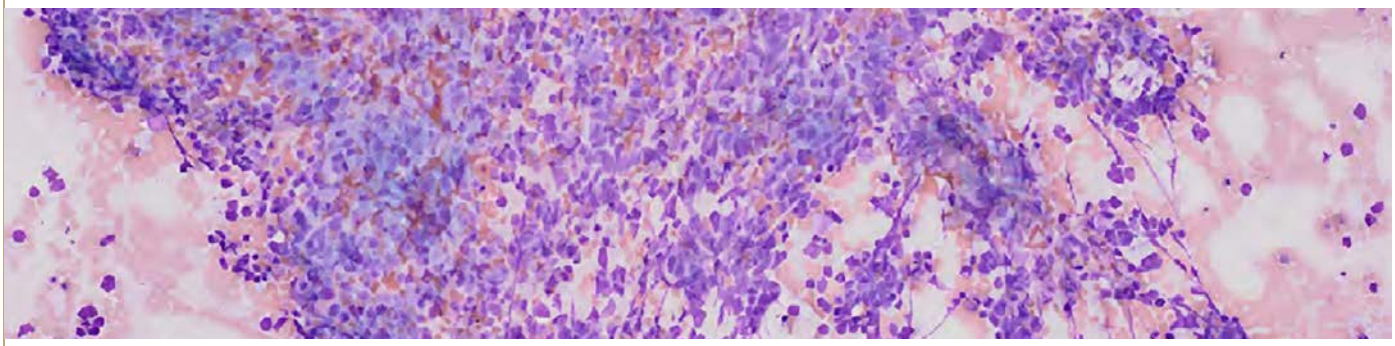
Consultations with adjunctive services are coordinated. Each new patient is evaluated by appropriate team members, and a treatment plan is recommended to the patient and referring physician. Resident attendance at the clinics is encouraged for educational benefits. In addition to discussion of new cases, 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 facilitate more effective physician consultative planning and management decisions. Involvement of a dedicated Head & Neck Cancer Nurse navigator allows for efficiency in scheduling appointments and improving patient convenience.

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.

Current surgical, radiation and chemotherapeutic strategies emphasize state-of-the-art techniques designed to maximize cure rates while preserving function.



HEMATOLOGY AND ONCOLOGY

The Section on Hematology and Oncology is comprised of clinical and research faculty who emphasize access to the most effective treatments and clinical trials. With recent advances in targeted agents and immunotherapy, the value of subspecialty care and access to novel agents through clinical trials has continued to increase. Our physicians emphasize clinical and translational research and the multidisciplinary care of patients with all types of cancer.

Participation of hematology and oncology physicians is critical to the success of tumor board conferences which emphasize communication and consensus recommendations for patients. These conferences exist for the cancers most commonly diagnosed at our institution including breast, lung, colon, prostate, head and neck, lymphoma, and leukemia. The full spectrum of Hematologic and Oncologic disorders are expertly treated by the Section's faculty while areas of research focus include the Prostate, Breast and Brain Tumor Centers of Excellence within the Comprehensive Cancer Center.

Other areas of subspecialty expertise include leukemia and lymphoma, myelodysplasia, myeloma, lung cancer, head and neck cancers, gastrointestinal cancers, genitourinary cancers, sarcoma, melanoma, bonemarrow and stem cell transplants and 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 has leverage state of the art tumor genome sequencing technology to identify and match specific cancer genetic signatures with treatments targeting genes that drive the cancers growth.

The goals of these and other team efforts are:

» 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 opportunities for focused clinical and translational research.

Forty-two MD and PhD members compose the full-time faculty of the Section of Hematology and Oncology. 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 Quality Oncology Practice Initiative (QOPI) — 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 in 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.

In 2017, Hematology and Oncology Section members enrolled approximately 507 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.

Section of Hematology and Oncology faculty are committed to providing state-of-the-art novel therapies to our patients. The clinical mission of the Section is also supported by 25 Physician Assistants and Nurse Practitioners. Multiple faculty members serve in leadership positions in 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 2017, Section members enrolled approximately 507 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.
- 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. Hematology and Oncology faculty continuously staff a busy inpatient consult service. A smooth transition between inpatient and outpatient care is a major goal of our efforts to provide outstanding 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, High Point and Statesville. A strong relationship exists with the Veterans Administration facilities in Salisbury and Kernersville. The oncology services for these facilities are primarily provided by cross-appointed faculty members and members of the Hematology and Oncology Section. These locations allow military service members and their dependents to receive cancer and blood disorder care much closer to home than was previously possible.

OPHTHALMOLOGY

The Wake Forest Baptist Health Eye Center and the Department of Ophthalmology 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 has been performed at our institution for over 25 years, and 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 small melanomas of the choroid as well.

Tumors of the eyelids and orbit are managed by Patrick Yeatts, 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, 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 by Dr. Yeatts and by Matthew Giegengack, MD, a corneal and external disease specialist. Malignancies of ocular surface may be treated surgically, with cryotherapy or with topical chemotherapy. Many of these management strategies have been developed at our Eye Center. 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.

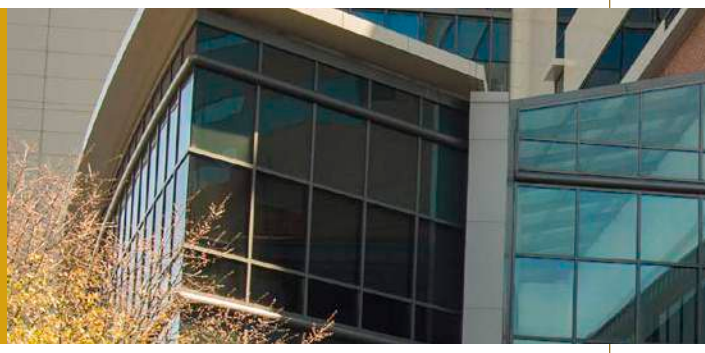
Patients with these tumors are now routinely treated with limb salvage techniques. In a recent study, our 10-year survival rate for non-metastatic primary extremity osteosarcoma was 71 percent, an accomplishment for which the team is very proud. In addition, more than 90 percent of patients with metastatic lesions of bone with actual or impending pathologic fractures are treated so as to preserve a functional limb; some of these procedures utilize bone-replacing endoprostheses. These techniques also have been applied to the treatment of bone defects from causes other than cancer, such as massive osteolysis after failure of total joint replacements, thus adding additional capabilities to the general orthopaedic treatment options at the Wake Forest Baptist.

Benign lesions of bone and soft tissues are encountered more frequently than primary malignant tumors of these tissues and account for many of the surgeries performed. However, many benign bone and soft tissue lesions can be treated without surgery, with the diagnosis being confirmed 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 currently under way with colleagues in several other departments. Regular orthopaedic oncology teaching conferences are part of the core curriculum within the residency program in addition to an annual full-day 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 in 24 to 48 hours for urgent referrals.

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.



ORTHOPAEDIC ONCOLOGY

Orthopaedic Oncology, part of the Cancer and Musculoskeletal Service Lines, addresses the comprehensive and specialized care of patients with tumors. Within these service lines there are two fellowship-trained orthopaedic oncologists, Scott Wilson, MD, and Cynthia Emory, MD, MBA, who see adult and pediatric patients in the Comprehensive Cancer Center three days a week and can see new patients within 24-72 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 recon¬-struction techniques — including modular endoprostheses, 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 radio¬therapy. 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 and other academic centers. The Orthopaedic Oncology team recently completed a multicenter clinical trial which investigated a novel surgical treatment for metastatic tumors of the arm with an innovative and minimally invasive implant to improve patients' pain and function. This device was recently FDA approved, and steps are in place to redefine care for patients with these types of tumors using this new technology.

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. 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 approximately 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. Both the inpatient unit and outpatient clinic are scheduled to undergo a renovation in early 2018. 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/oncol¬ogists: 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, and two clinical research associates. 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 she 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 practices general pediatric hematology/oncology and has developed expertise in pediatric neuro-oncology, working in collaboration with members of the WFBMC Brain Tumor Center of Excellence.

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, although section members are also involved in several investigator-initiated research projects.

Over 41,076 prescriptions were dispensed in the Cancer Center community pharmacy in 2017 with over 4309 prescriptions for oral chemotherapy.

PHARMACY

Cancer treatments are becoming more complex involving immunotherapy and pharmacogenomics and the number of new drugs approved for oncologic malignancies is at its peak. Oncology pharmacists serve an important role on the multidisciplinary team for cancer patients and provide medication management services across the care continuum. Pharmacist work closely with other healthcare professionals to develop institutional guidelines and assist with evidence-based decisions for treating patients. Pharmacy staff also assist patients through transitions of care, oral chemo management, infusion therapy, and self-care at home. In the acute care setting the pharmacy team completes admission medication reconciliation, patient education and discharge medication review and delivery of medications. The pharmacy team is actively involved with the patient care team and ensuring medications are appropriate—patient safety is a top priority.

In the ambulatory setting the pharmacy team supports safe and effective processing of intravenous chemotherapy orders in seven infusion clinics. Utilizing several important safety checks in verifying and compounding chemotherapy, the pharmacy team prepared over 45,000 patient-specific infusions in 2017 fiscal year. The Pharmacy Department is a global leader in adoption of automated intravenous medication preparation for hazardous drugs. Using high-precision robotics helps ensure safety in preparation for patients, family members and employees. Over the last year more than 80% of all chemotherapy was made on the chemotherapy robot at the main campus.

In addition to compounding services, clinical pharmacists are embedded in the ambulatory multispecialty medical oncology clinic to provide direct patient and provider education, adherence monitoring, improve access to medications, and serve as authoritative resource on the optimal use of medications to treat cancer patients.

In the home setting, the Wake Forest Community and Specialty Pharmacies provide home infusion therapies, drug-specific pharmaceutical care plans, and routine patient follow-up. Pharmacists secure access to limited distribution oral oncology agents through Wake Forest operated pharmacies. Over 41,076 prescriptions were dispensed in the Cancer Center community pharmacy in 2017 with over 4309 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 pharmacy also has a dedicated team of pharmacy technicians that assist with prior authorizations and other medication related needs and provide on-call services 24/7.

The Department of Pharmacy fulfills an educational and research mission and offers a postgraduate 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 more than 200 investigational studies through protocol review and research committee participation. Pharmacy staff are responsible for preparation, order verification, dispensing, and inventory management of investigational medications to ensure compliance with research standards. The team works closely with research coordinators to provide patient education.

PHILANTHROPY

REMARKABLE BREAKTHROUGHS BEGIN WITH PRESCIENT, CARING DONORS

The Comprehensive Cancer Center thrives with the generosity of individual donors whose foresight recognizes possibilities for life-saving innovations. In addition to federal grants, foundation and industry support, philanthropists offering gifts large and small demonstrate a remarkable commitment to our mission.

In 2017, patients, families—and others in this community—contributed $3.91 million. Their support touches every area of the Cancer Center from research to clinical care and patient support in the Cancer Patient Support Program. Many of the contributions made in 2017 fueled high-risk/high-reward oncology research.

The Cancer Center's annual signature philanthropic event, Winterlark, raises more than half of the necessary annual budget for the Cancer Patient Support Program. With the help of corporate sponsors and guests, some whose commitment spans more than 30 years, the 2017 Winterlark raised $270,000.

One example of an inspiring partnership for giving is the one formed with undergraduate students of Wake Forest University 30 years ago. The students host a series of campus fundraising events honoring the memory and spirit of alumnus Brian Piccolo, and their proceeds go to the Piccolo Fund at the Cancer Center. In 2017, the amount raised for the year was more than $400,000.

The group effort that sustains the Piccolo Fund has served as pilot funding for research, inspired countless Wake Forest students to consider a future in medicine or research and instilled in the student culture an appreciation for giving.

John G. Williard and his family invest in the Hematologic Malignancy Program in honor of Patricia Grant Williard.

Individual contributors to specific initiatives also make a tremendous impact for the Cancer Center. In 2017, John G. Williard and his family, including son Grant and daughter Beth, renewed their commitment to the Hematology and Oncology Program by investing in the Patricia Grant Williard Fund.

The fund, named after John's late wife, has provided resources for the Hematologic Malignancy Program to pursue novel therapeutics and bring new investigators and clinicians onto the team.

Bayard Powell, MD, chief of the section on hematology and oncology, said, "With the philanthropic support by this family that has been so touched by cancer, we are able to expand our ability to care for patients and ultimately be a part of finding cures for blood cancers."

Sometimes philanthropy is a legacy gift endowing groundbreaking research. Sometimes it can be a modest contribution toward a family's expenses while their loved one is in the hospital. At any level, the philanthropic spirit that lives in many generous individuals makes the Comprehensive Cancer Center the leading institution it is today.

Wake Forest University students present check to the Piccolo Fund at the Cancer Center.

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.

RADIATION ONCOLOGY

Radiation Oncology continues to grow as it moves toward being a "Top 10" radiation oncology department nationally. There are currently 10 radiation oncologists, 10 radiation physicists and two radiation biologists. The department's location in the Outpatient Comprehensive Cancer Center building allows for multidisciplinary cancer care in 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 seven 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 45 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 5,500 patients in that time. Other 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 180 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 provided consultation for more than 3,500 patients, saw 5,500 in follow-up and treated approximately 2,500 with external beam radiation therapy and approximately 1,500 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 certain benign diseases.

CANCER SECOND OPINION PROGRAM

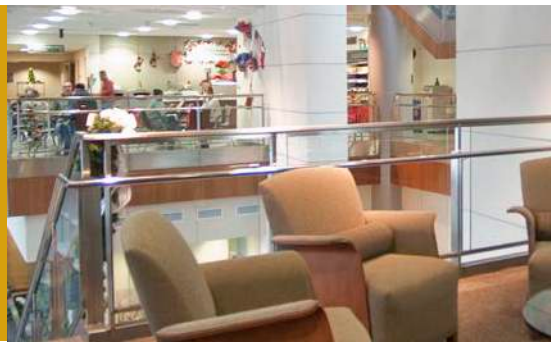
In the first part of 2017, the Cancer Center launched a Second Opinion program for patients diagnosed with cancer. The mission of the program is to create an exceptional patient experience by providing a complete and expedited second opinion to patients diagnosed outside our facility; empower patients with knowledge of their condition and treatment options, and elicit comprehensive clinical recommendations that lead to highest quality and timely treatment options.

A special Second Opinion care team including a clinical navigator, care navigator and medical records specialist has been created under the Oncology Service Line. This team provides initial intake, ensures that medical records are gathered and reviewed and provides a "concierge" service for the patient. In conjunction with the multidisciplinary cancer specialists and their clinic staff, the patient is provided exceptional service and a personalized care management plan.

In the 10 months since the program was launched, there have been 116 patients enrolled, of whom 108 completed full evaluations. Of these patients, 61 percent have chosen to stay for all or a portion of their care at our Cancer Center. While only 2 percent of second opinions from Cancer Center providers differed from the opinions of the outside providers, 20 percent of the treatment recommendations differed from the outside recommendations. The second opinion program garnered participation from more than 35 providers from multiple disciplines across the Cancer Center.

It is evident the Cancer Second Opinion program has been successful and has provided the patient with an exceptional service while combining the outstanding resources of the Cancer Center.

Programs and services are integrated into the ongoing care of patients in order to make professional assistance available easily and in concert with medical care.



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 in concert with medical care. For example, all patients are screened periodically for distress when they are seen by their cancer health care 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 seven professionals trained in counseling, administrative support, and therapeutic music. Most of our volunteers are either 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 for medical treatment. It is not uncommon for our staff to counsel 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 in 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 in 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 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.

CONTINUED

- 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 – 2017 CLINICAL TRACKING

CLINICAL CONTACTS	ANNUAL TOTAL
Support Room Hem / Onc (#pts)	767 contacts
Support Room Radiation (#pts)	453 contacts
Patient / Family Contact: (Unscheduled: Clinic / Hospital)	180 contacts
Outpatient Counseling Session (#pts)	783 contacts
HOA, HOB, HOC (#pts)	267 contacts
Solid Tumor: Inpt Interview/Ind Counseling (#pts)	3 contacts
Leukemia: Inpt Interview / Ind Counseling (#pts)	438 contacts
BMT Assessment (#pts)	153 contacts
BMT: Inpt Interview / Ind Counseling (#pts)	85 contacts
Surgical Onc: Inpt Interview / Ind Counseling (#pts)	200 contacts
GynOnc: Inpt Interview / Ind Counseling (#pts)	10 contacts
RadOnc: Inpt Interview / Ind Counseling (#pts)	0 contacts
Crisis Intervention (#pts)	48 contacts
Student Intern Patient Contacts (#pts)	1143 contacts
Student Intern Hours	828 hours
Phone Contact (Pt-Related)	964 contacts
Financial Aid to Patients	560 contacts
SECU Place Referrals	21 contacts
SUPPORT GROUPS	
Coffee & Conversation for Caregivers	114 attended
CPSP Welcome Hour	840 attended
Pathways to Survivorship	31 contacts
Seasons of Survival	89 contacts
TOTAL OUTPATIENT CONTACTS	**7666 contacts**
TOTAL INPATIENT CONSULTS	**1261 contacts**

SUPPORTIVE CARE SERVICES	
Harp Therapy (#pts)	410 contacts
Mind-Body Classes (i.e., Tai Chi & Yoga)	209 contacts
Massage (#pts)	1053 contacts
Drum Circle (#pts)	207 contacts
Total Hours of Live Music	217 hours
TOTAL SUPPORTIVE CARE CONTACTS	**1879 contacts**

VOLUNTEER SERVICES	
Support Room Hem/Onc	23,796 contacts
Support Room Radiation	11,971 contacts
Resource Room	272 contacts
Total Hours	3280 hours
TOTAL CONTACTS	**39,319 contacts**

MEETINGS / EVENTS	
Volunteer Education / Meetings	12 volunteers
Community Liaison / Meetings	17 liaisons
Community Presentation (inc support groups)	48 presentations
Teaching Students / Residents / Fellows on-campus	22 presentations
Health Team Meetings / Rounds	26 meetings
Committee Meetings (medical center)	78 meetings
Med Center Staff Support / Consult with Interdisciplinary Staff	200 events
Staff Development (Edu. conferences / staff mtgs)	68 events

Surgical Oncology 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.

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 had 1,563 major operative cases and more than 8,720 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 practitioners support the breast care clinic (Sally Hauser, NP and Shanna Steelman, NP), as well as inpatient (Nathan Ogilvie, PA, and Samantha Jones, NP) and outpatient (Stephanie Staley, NP) surgical oncology 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 125 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 3 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. Last year we expanded our faculty with the addition of Dr. Akiko Chiba to the breast service with Dr. Howard-McNatt and Dr. Levine. The clinical work in breast cancer works hand in hand with the research team in the BCC.

In 2017, the BCC cared for 379 cases which compares to 365 new breast cancer in 2016; 350 in 2015; 347 in 2014; 277 in 2013; 235 in 2012; 252 in 2011; 184 in 2010; and 211 in 2009. This represents a nearly two-fold increase in new breast cancer cases over the past seven years. The BCC is led by Dr. Howard-McNatt with Dr. Akiko Chiba in her 2nd year (from the Mayo clinic breast surgery fellowship program) and Dr. Levine. Dr. Chiba has started seeing patients at the Greensboro clinic in January, 2017 as well as writing competitive grants this year. Dr. Howard-McNatt was the editor of "Changing Paradigms in the Management of Breast Cancer," published by Springer, October, 2017.

The BCC utilizes one of the best payor mixes in the institution, and competes well within Forsyth county for patients. The clinic in Clemmons is doing well, led by Dr. Howard-McNatt, with Sally Hauser, NP and Shanna Steelman, NP. At the Clemmons office they have busy clinics predominantly for benign breast disease and survivorship, which are nearly full in their 6th year of operation. The breast care clinic has NAPBC certification with full continuing accreditation of the center. The breast surgery effort strongly supports the DOT in the Cancer Center, which Dr. Howard-McNatt co-chairs.

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.

CONTINUED

HepatoPancreaticoBiliary (HPB) surgery relates to complex liver and pancreas surgery, led by Dr. Shen with Drs. Clark and Howerton. 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 re¬section, and has performed several successful "robotic" resections. This year Dr. Shen introduced a new therapy for pancreatic (and other) cancers; irreversible electroporation or IRE. IRE allows for treatment of locally advanced tumors which were not previously operable and we are among the first centers to offer this treatment. 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 last year.

The HPB service has continued to expand and lead the region for complex consultations. Last year clinic time was added in Greensboro for Drs. Shen and Clark to further expand the HPB efforts. The HBP service also hosted the 6th Biannual HPB/GI Oncology Symposium on October 20, 2017, which featured guest speaker Dr. William Traverso, a renowned pancreatic surgeon. Dr. Shen published a book on "optimizing outcomes for Liver and Pancreas Surgery" in 2017.

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 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. . Dr. Votanopoulos has also initiated research into using organoids grown from fresh harvested tumor tissue in collaboration with the regenerative medicine team. This has led to grant applications with major presentations/publications anticipated in early 2018.

Endocrine surgery: 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. Dr. Cannon works with Dr. Henderson (endocrinology) as a multimodality team in the surgical oncology clinics.

Peritoneal malignancy program: 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 performed 76 HIPEC cases in 2017, with more than 1,400 cases followed in our prospective data registry. 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 manuscript on 1,000 HIPEC cases was the most cited manuscript in the Journal of the American College of Surgeons over the past 3 years.

Our HIPEC program, led by Dr. Levine, celebrated its 26th anniversary on December 30th, and continues to flourish, despite substantial increases in competition for these cases (see figure below). This represents a >50% increase in our volume in the last decade. Further, we have maintained this national practice despite several new centers in the region and many more nationally now competing with us. Our total experience (now 1,461 cases in 1,333 patients) is truly world class.

We presented the results of the first prospective randomized trial for cancer of the appendix ever completed worldwide at the Southern Surgical Association, December 4, 2017. Dr. Levine has led a team which included MD Anderson and the University of Pittsburgh and has completed accrual in the first randomized trial for cancer of the appendix ever for any stage of disease. The manuscript was accepted for publication in the Journal of the American College of Surgeons within a day of submission.

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.

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, medical and physician assistant 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/multi-modality 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 September 23rd, 2017, Surgical Oncology sponsored its 12th 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 University, Johns Hopkins (2), Louisiana State University, Eastern Virginia University and the Medical College of Wisconsin. The American Board of Surgery created the certification program in Surgical Oncology in 2013. Our application to the Board of Surgery for accreditation was approved in 2014 and our fellowship is now fully accredited (one of only 25 programs in North America so honored). In 2017 we graduated/placed of our 6th Surgical Oncology fellow (Dr. Rebecca Dodson) and recruited of our eighth & ninth Surgical Oncology fellows (Drs. Enomoto and Moave).

RESEARCH

Surgical Oncology actively supports research in basic science, translational science and clinical arenas. 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. Clinical trials in association with the NRG are coordinated by Dr. Levine, who serves as their principal investigator. In 2017, Surgical Oncology enrolled nearly 200 patients on treatment protocols and more than 1,000 on tissue-procurement studies. The surgical oncology faculty had a total of 14 research protocols open during 2017. 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 continued 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. He has also published a manuscript on organoids grown from tumors removed by our team. 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 breast cancer care in elderly women.

These efforts led to the publication of a 42 manuscripts and book chapters in 2017, as well as 2 books and 45 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.

This year the surgical oncology research team merged with the Comprehensive Cancer Center research program entirely. Drs. Shen, Howard-McNatt and Votanopoulos are co-leaders of the GI, Breast and Melanoma DOT's respectively. Dr. Levine was appointed senior advisor to the Cancer Center Director and remains the institutional principal investigator for the NRG cooperative oncology group. Our clinical research was highlighted by a publication in the New England Journal of Medicine (co-authored by Dr. Levine) on the practice changing MSLT-2 trial, which showed that complete lymphadenectomy is not routinely required for melanoma metastatic to sentinel lymph nodes. Dr. Shen led the surgical oncology team to completion of a prospective randomized trial using negative pressure dressings on laparotomy incisions for oncologic surgery, which was published in the Journal of the American College of Surgeons.

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, 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. Survivorship Care Plans are progressing with IT activated breast and lung sites in Epic.

The Urologic Oncology program brings together clinicians from multiple departments in the Medical Center to provide multidisciplinary cancer care and carry out innovative clinical trials to improve care of patients with genitourinary malignancies.

UROLOGIC ONCOLOGY

The Urologic Oncology program in the Comprehensive Cancer Center brings together clinicians from multiple departments in the Medical Center to provide multidisciplinary cancer care and carry out innovative clinical trials to improve 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 2017, 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.

2016 CANCER DATA

2016 CANCER REGISTRY DATABASE

TOTAL CASES*	NUMBER	PERCENT
Lung	591	12.4
Breast	527	11.1
Melanoma of skin	336	7.1
Colorectal	309	6.5
Prostate	275	5.8
Oral cavity, pharynx	266	5.6
Brain, CNS	231	4.9
Leukemia	218	4.6
Kidney, renal pelvis	207	4.3
NH Lymphoma	198	4.2
Pancreas	163	3.4
Bladder	146	3.1
Uterus	128	2.7
Thyroid	122	2.6
Multiple myeloma	89	1.9
Liver, intrahepatic bile duct	74	1.6
Larynx	70	1.5
Esophagus	69	1.5
Stomach	65	1.4
Ovary	59	1.2
Connective tissue	58	1.2
Other endocrine	48	1
Other female	48	1
Unknown primary	44	0.9
Eye	37	0.8
CMPD, MDS	36	0.8
Other skin	36	0.8
Gallbladder, biliary	35	0.7
Mets SCCa/BCCa	33	0.7
Small intestine	33	0.7
Cervix	32	0.7
Hodgkins disease	24	0.5
Bone	21	0.4
Anus, anal canal	21	0.4
Retroperitoneum	19	0.4
Other urinary	18	0.4
Testis	17	0.4
Nasal, sinus	16	0.3
Other male	13	0.3
Ill-defined	8	0.2
Pleura, mediastinum, heart	6	0.1
Thymus	6	0.1
Other Hematopoietic	6	0.1
Other digestive	4	0.08
Trachea	2	0.04
Peripheral nerves	1	0.02
Total Cases	**4765**	**100**

GENDER	NUMBER	PERCENT
Male	2440	51.2
Female	2325	48.8
RACE		
White	3972	83.4
Black	578	12.1
Other	91	1.9
ETHNICITY-HISPANIC		
Male	51	1.1
Female	73	1.5
CLASS OF CASE		
Analytic/new dx	4094	85.9
Non-analytic/recurr	468	9.8
Dx workup	203	4.3
RESIDENCE		
North Carolina	4053	85.1
Other States in USA	711	14.9
Outside of USA	1	0.02
PATIENT HISTORY		
Family History	3094	64.9
Tobacco History	2822	59.2
cigarette	785	
cigar/pipe	19	
snuff/chew/smokeless	102	
combination use	18	
previous use	1898	
Alcohol History (2 or more drinks/day)	598	12.5
current use	431	
past history	167	
PRIMARY NEOPLASMS		
One primary only	3384	71
First of two primaries	216	4.5
Second primary	757	15.9
Third primary	161	3.4
Fourth primary	36	0.8
Fifth primary	10	0.2
Sixth primary	6	0.1
Seventh primary	1	0.02
Eighth primary	1	0.02
Benign neoplasms	200	4.2

*Includes malignant, in-situ, selected benign cases, newly diagnosed, recurrent and diagnostic workup cases
Note: In 2016, the cancer registry stopped collecting consults/second opinions and benign salivary gland tumors.

COMPARISON OF 2016 WFBMC, STATE AND NATIONAL DATA

	WFBMC		NORTH CAROLINA		USA	
PRIMARY SITE	CASES	PERCENT	CASES	PERCENT	CASES	PERCENT
Lung	537	14.5	8,768	15.5	224,390	13.3
Breast	391	10.5	8,263	14.6	249,260	14.8
Oral cavity, pharynx	228	6.2	1,506	2.7	48,330	2.9
Melanoma of skin	226	6.1	2,684	4.8	76,380	4.5
Colorectal	225	6.1	4,586	8.1	134,490	8
Prostate	222	6	7,704	13.6	180,890	10.7
Leukemia	189	5.1	1,408	2.5	60,140	3.6
Kidney, renal pelvis	188	5.1	2,039	3.6	62,700	3.7
NH Lymphoma	168	4.5	2,088	3.7	72,580	4.3
Pancreas	147	4	1,467	2.6	53,070	3.2
Uterus	119	3.2	1,614	2.9	60,050	3.6
Thyroid	114	3.1	1,393	2.5	64,300	3.8
Bladder	114	3.1	2,489	4.4	76,960	4.6
Brain, CNS	80	2.2	747	1.3	23,770	1.4
Multiple myeloma	76	2.1	865	1.5	30,330	1.8
Liver, intrahepatic bile duct	65	1.8	905	1.6	39,230	2.3
Larynx	53	1.4	528	0.9	13,430	0.8
Stomach	52	1.4	777	1.4	26,370	1.6
Esophagus	50	1.4	547	1	16,910	1
Connective Tissue	49	1.3	376	0.7	12,310	0.7
Ovary	41	1.1	727	1.3	22,280	1.3
Small intestine	28	0.8	343	0.6	10,090	0.6
Cervix	27	0.7	385	0.7	12,990	0.8
All other sites	321	8.7	4,276	7.6	113,960	6.8
Total Cases	**3710**	**100**	**56,485**	**100**	**1,685,210**	**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 diagnostic workups.

WFBMC—exact figures
NC—estimated numbers from NC Central Cancer Registry Facts and Figures 2016
USA—estimated numbers from American Cancer Society Cancer Facts and Figures 2016

PRIMARY SITE DISTRIBUTION 2016

Site	Total	Class of Case*			Gender, Race, and Ethnicity							
		A	NA	C	white		black		other		hispanic	
					male	female	male	female	male	female	male	female
Total Cases	**4765**	**4094**	**468**	**203**	**2055**	**1917**	**284**	**294**	**50**	**41**	**51**	**73**
Oral cavity, pharynx	**266**	**236**	**21**	**9**	**156**	**79**	**17**	**4**	**5**	**2**	**2**	**1**
lip	10	10	0	0	6	4	0	0	0	0	0	0
tongue	87	75	9	3	57	20	4	2	2	1	0	1
gum	13	13	0	0	8	4	1	0	0	0	0	0
floor of mouth	19	19	0	0	10	5	2	0	1	1	0	0
palate	12	10	1	1	4	8	0	0	0	0	0	0
other mouth	24	22	2	0	13	11	0	0	0	0	0	0
salivary, malignant	21	17	4	0	12	8	1	0	0	0	0	0
tonsil	46	40	2	4	25	12	5	1	1	0	2	0
oropharynx	15	13	2	0	8	5	1	1	0	0	0	0
nasopharynx	6	5	1	0	3	1	1	0	1	0	0	0
pyriform sinus	4	3	0	1	3	1	0	0	0	0	0	0
hypopharynx	8	8	0	0	6	0	2	0	0	0	0	0
other oral cavity	1	1	0	0	1	0	0	0	0	0	0	0
Digestive system	**773**	**622**	**92**	**59**	**354**	**265**	**53**	**56**	**12**	**2**	**13**	**18**
esophagus	69	51	2	16	54	10	2	0	1	0	0	0
stomach	65	54	3	8	29	23	4	7	0	1	1	2
small intestine	33	28	3	2	13	12	4	0	2	0	1	1
colon	225	159	59	7	86	88	15	27	1	1	4	3
rectosigmoid	21	18	2	1	11	10	0	0	0	0	0	0
rectum	63	50	9	4	32	21	6	4	0	0	0	0
anus/anal canal	21	14	1	6	8	7	1	3	0	0	0	2
liver	74	65	5	4	36	17	6	3	5	0	6	1
gallbladder	9	7	2	0	4	3	0	0	0	0	0	2
biliary	26	25	0	1	13	7	2	2	1	0	0	1
pancreas	163	147	6	10	66	65	13	10	2	0	1	6
other digestive	4	4	0	0	2	2	0	0	0	0	0	0
Respiratory system	**685**	**615**	**46**	**24**	**337**	**244**	**49**	**40**	**3**	**4**	**4**	**4**
nasal cavity	9	9	0	0	6	2	1	0	0	0	0	0
sinuses	7	6	1	0	3	3	1	0	0	0	0	0
larynx	70	55	12	3	44	15	4	4	1	0	1	1
lung-non small cell	509	465	27	17	240	188	39	31	2	3	3	3
lung-small cell	82	73	6	3	38	34	4	5	0	1	0	0
thymus	6	6	0	0	4	2	0	0	0	0	0	0
trachea	2	1	0	1	2	0	0	0	0	0	0	0
Pleura / Med / Heart	**6**	**6**	**0**	**0**	**4**	**1**	**0**	**1**	**0**	**0**	**0**	**0**
Bone	**21**	**17**	**2**	**2**	**11**	**7**	**1**	**0**	**1**	**0**	**0**	**1**
Hematopoietic system	**349**	**295**	**43**	**11**	**152**	**122**	**33**	**21**	**6**	**1**	**6**	**8**
multiple myeloma	89	76	10	3	35	28	13	8	0	1	2	2
lymphoid leukemia	69	59	9	1	27	28	7	4	3	0	0	0
myeloid leukemia	139	120	14	5	63	42	13	9	3	0	3	6
other/leukemia	10	10	0	0	5	5	0	0	0	0	0	0
CMPD,MDS	36	24	10	2	18	17	0	0	0	0	1	0
other	6	6	0	0	4	2	0	0	0	0	0	0

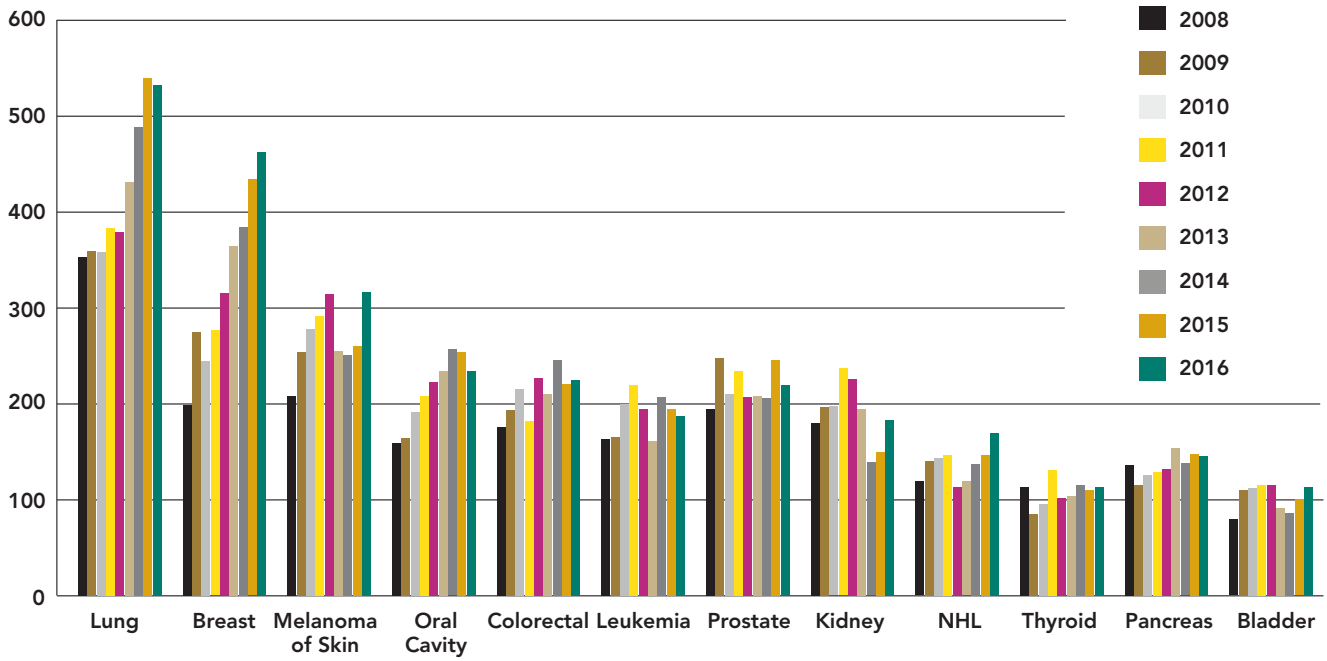
Site	Total	Class of Case*			Gender, Race and Ethnicity							
		A	NA	C	white		black		other		hispanic	
					male	female	male	female	male	female	male	female
Skin	**405**	**348**	**22**	**35**	**264**	**129**	**1**	**5**	**1**	**0**	**3**	**2**
melanoma	336	319	17	0	215	114	0	2	1	0	2	2
other skin	36	29	5	2	21	10	1	3	0	0	1	0
mets SCCa/BCCa	33	0	0	33	28	5	0	0	0	0	0	0
Peripheral Nerves	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Retroperitoneum	**19**	**17**	**2**	**0**	**5**	**11**	**1**	**1**	**0**	**0**	**0**	**1**
Connective tissue	**58**	**49**	**7**	**2**	**36**	**15**	**1**	**4**	**0**	**0**	**0**	**2**
Breast	**527**	**467**	**49**	**11**	**2**	**420**	**0**	**74**	**0**	**16**	**0**	**15**
Female genital system	**267**	**230**	**14**	**23**	**0**	**227**	**0**	**30**	**0**	**4**	**0**	**6**
vulva	35	29	2	4	0	26	0	8	0	1	0	0
vagina	5	2	0	3	0	4	0	1	0	0	0	0
cervix	32	27	2	3	0	24	0	5	0	2	0	1
uterus	128	124	4	0	0	112	0	13	0	0	0	3
ovary, malignant	46	41	5	0	0	42	0	2	0	0	0	2
ovary, borderline	13	0	0	13	0	12	0	1	0	0	0	0
other female	8	7	1	0	0	7	0	0	0	1	0	0
Male genital system	**305**	**249**	**52**	**4**	**225**	**0**	**63**	**0**	**7**	**0**	**10**	**0**
penis	7	7	0	0	5	0	1	0	0	0	1	0
prostate	275	222	49	4	201	0	61	0	6	0	7	0
testis	17	15	2	0	13	0	1	0	1	0	2	0
other male	6	5	1	0	6	0	0	0	0	0	0	0
Urinary system	**371**	**322**	**42**	**7**	**219**	**86**	**25**	**22**	**6**	**6**	**4**	**3**
kidney	197	185	9	3	112	44	15	15	4	3	1	3
renal pelvis	10	7	3	0	3	5	1	0	0	1	0	0
ureter	10	9	1	0	7	1	0	1	0	1	0	0
bladder	146	114	28	4	93	33	9	6	2	0	3	0
other urinary	8	7	1	0	4	3	0	0	0	1	0	0
Eye	**37**	**35**	**0**	**2**	**18**	**15**	**0**	**2**	**1**	**0**	**1**	**0**
Brain, CNS	**231**	**206**	**24**	**1**	**94**	**111**	**10**	**7**	**4**	**0**	**3**	**2**
brain, malignant	89	80	8	1	40	40	2	3	3	0	0	1
brain, benign	142	126	16	0	54	71	8	4	1	0	3	1
Thyroid/Endocrine	**170**	**150**	**17**	**3**	**54**	**84**	**5**	**17**	**1**	**2**	**1**	**6**
thyroid	122	114	6	2	32	69	2	12	0	1	0	6
adrenal	4	4	0	0	0	0	1	2	0	0	1	0
other, malignant	1	1	0	0	1	0	0	0	0	0	0	0
other, benign	43	31	11	1	21	15	2	3	1	1	0	0
Lymphoma	**222**	**188**	**31**	**3**	**99**	**82**	**21**	**10**	**2**	**1**	**4**	**3**
NH Lymphoma	198	171	25	2	90	73	19	8	2	1	4	1
Hodgkins disease	24	17	6	1	9	9	2	2	0	0	0	2
Unknown Primary	**44**	**36**	**3**	**5**	**19**	**17**	**3**	**0**	**1**	**3**	**0**	**1**
Ill-defined	**8**	**6**	**1**	**1**	**6**	**1**	**1**	**0**	**0**	**0**	**0**	**0**

*Class of Case: A=analytic, newly diagnosed; NA=non-analytic, first seen with recurrent disease; C=diagnostic workup, Reportable by Agreement per Cancer Committee, squamous intraepithelial neoplasia grade III

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

Note: In 2016, the cancer registry stopped collecting consults/second opinions and benign salivary gland tumors.

COMPARISON OF WFBMC MOST PREVALENT SITES BY YEAR newly diagnosed cases



2017 PUBLISHED ABSTRACTS

Published Abstracts:

CBB = Cancer Biology and Biochemistry Program

CPC = Cancer Prevention and Control Program

CRP = Clinical Research Program

TPR = Tumor Progression and Recurrence Program

1. Abla O, Ribeiro RC, Testi AM, Montesinos P, Creutzig U, Sung L, Di Giuseppe G, Stephens D, Feusner JH, Powell BL**(CRP)**, Hasle H, et al. Predictors of thrombohemorrhagic early death in children and adolescents with t(15;17)-positive acute promyelocytic leukemia treated with ATRA and chemotherapy. Ann Hematol. 2017.

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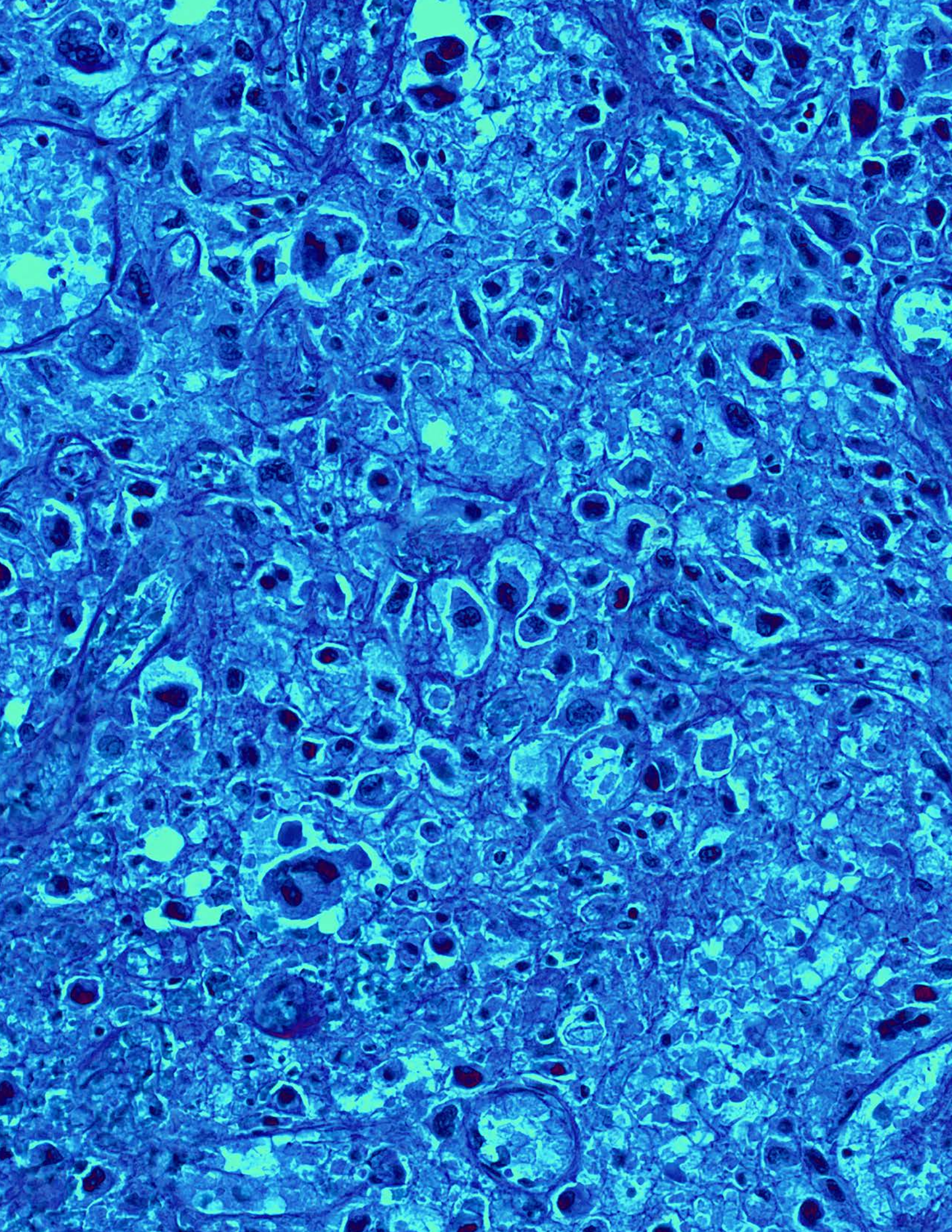

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