



cancer program

2020

ANNUAL REPORT // 2019 STATISTICS

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“Our Comprehensive Cancer Center continues to conduct research that will provide our patients with novel approaches to treating cancer, as well as address the needs of our survivors and the community.”

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

COMPREHENSIVE CANCER CENTER OF WAKE FOREST BAPTIST HEALTH

The Wake Forest Baptist Comprehensive Cancer Center (WFBCCC) 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 51 NCI Comprehensive Cancer Centers in the nation.

The mission of the WFBCCC 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 multidisciplinary training. The WFBCCC catchment area includes the Piedmont and southern Appalachian region, an area of 58 contiguous counties in North Carolina, Virginia and West Virginia.

WFBCCC serves a region with significant health disparities issues when compared to national averages for cancer incidence and mortality. To target these issues, the WFBCCC conducts basic, clinical and population research for the prevention, detection and treatment of cancer, translating this knowledge into strategies to improve patient outcomes and reduce the occurrence of cancer.

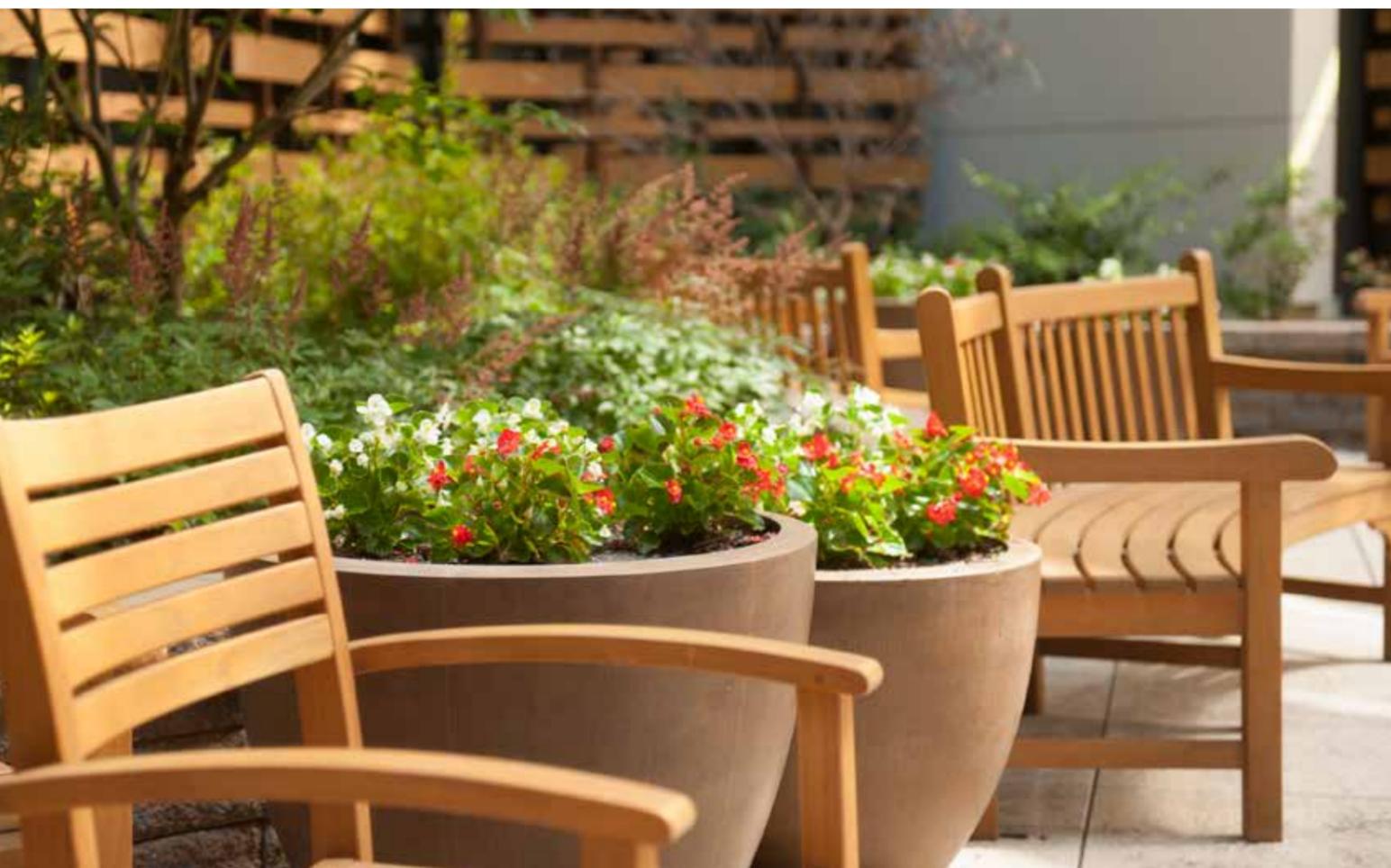
To also better serve its population, the WFBCCC established an Office of Cancer Health Equity in 2014 as part of its Community Outreach and Engagement (COE) initiative. The mission of the COE is to advance advocacy, community engagement and research focused on improving cancer outcomes by: 1) evaluating the cancer burden, risk factors and related disparities in the WFBCCC catchment area, 2) facilitating strategic research and diverse/inclusive clinical trial participation relevant to the WFBCCC cancer burden, 3) enhancing WFBCCC community collaborations to accelerate implementation of programs designed to reduce cancer burden and disparities, and 4) promoting policy directed at reducing cancer burden and disparities. The Office of Cancer Health Equity is specifically focused on conducting culturally relevant navigation, ongoing community outreach and engagement opportunities, and providing education and resources to patients and community members throughout WFBCCC catchment area.

There are 129 WFBCCC nationally and internationally renowned experts who provide specialized treatment through 13 disease-oriented and thematic teams: brain (neuro-oncology), breast, cancer survivorship and control, gastrointestinal, genitourinary, gynecologic, head and neck, hematologic malignancies, lung, melanoma, pediatric oncology, precision medicine and phase I, and sarcoma.

The Comprehensive Cancer Center research activities are led by 140 faculty members from 29 departments who conduct research across the Center’s four programs: Cancer Prevention and Control, Neuro-Oncology, Cancer Genetics and Metabolism, and Signaling and Biotechnology.

The WFBCCC is 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 entities within Wake Forest to advance the mission of the WFBCCC, such as: the Clinical and Translational Science Institute, the Center for Precision Medicine, the Center for Biomedical Informatics, the Sticht Center for Healthy Aging and Alzheimer’s Prevention, the Translational Alcohol Research Center, the Tobacco Control Center of Excellence, the Institute for Regenerative Medicine, the Maya Angelou Center for Health Equity, and the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences. Collaborations between research faculty conducting laboratory science, population health and clinical research 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 provide the opportunity for patients to have access to the newest therapies, prevention techniques and survivorship strategies. Patients receive treatment in our state-of-the-art facility, an 11-story cancer hospital, which houses 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. Additionally, the Center has expanded its clinical and research activities to several hospitals in the region including Davie, High Point, Lexington and Wilkes medical centers.



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 (ACS) and the North Carolina Central Cancer Registry. It plays an important role in ensuring that the cancer program is accredited by the ACS' Commission on Cancer and that the Breast Care Center is accredited by the National Accreditation Program for Breast Centers. The rectal program is seeking accreditation by the National Accreditation Program for Rectal Cancers.

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:

- » Medical Plaza – Clemmons
- » Provider-based clinics (Lexington, Elkin and Mount Airy)
- » Statesville practice
- » Wake Forest Baptist Health Davie Medical Center
- » Wake Forest Baptist Health Lexington Medical Center
- » Wake Forest Baptist Health Wilkes Medical Center
- » Wake Forest Baptist Medical Center (main campus)

In 2018, High Point Medical Center became a part of Wake Forest Baptist Health. The High Point Medical Center's Cancer Registry maintains the collection of cancer data for that facility.

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

The Cancer Registry continues to participate in the ACS' Rapid Cancer Reporting System (RCRS) formerly known as the Rapid Quality Reporting System. RCRS is a reporting and quality improvement tool that provides real clinical-time assessment of hospital-level adherence to quality of cancer care measures. Starting in 2021, the ACS requires the submission of all cancer sites. Previously, submission of breast, colon and rectal cancer cases were required.

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 primary. Outcome data provides survival information reflecting the effectiveness of treatment modalities. The Cancer Registry fulfills requests for cancer data from staff physicians, allied health professionals, outside institutions and requests for follow-up information from other cancer registries. All data requests are handled with the utmost care for the patient's confidentiality.

The Cancer Registry maintains data management and regulatory reporting on cancer statistics for various health care agencies. As required by law, cancer cases are reported to the North Carolina Central Cancer Registry. The data submitted is shared with the North American Association of Central Cancer Registries and the U.S.

Centers for Disease Control and Prevention's National Program of Cancer Registries. In addition, newly diagnosed cancer cases are submitted to the Commission on Cancer's National Cancer Database, a comparative database for ongoing assessment of cancer patient care that 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 (ACS). 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

- » A cancer program goal is 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 is established to address health care disparities and barriers to care for patients.
- » A Survivorship Clinic was implemented and 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 ACS' National Cancer Database are evaluated to improve the quality of care.
- » A process to integrate psychosocial distress screening is monitored each year.
- » The percentage of patients accrued to cancer-related clinical trials is monitored each year.
- » The American Joint Committee on Cancer's 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 oncology-certified nurses to RNs.
- » The Cancer Registry data and activities are evaluated and monitored for case-finding, accuracy of data collection, abstracting timeliness, quality, follow-up and data reporting.
- » A subcommittee monitors the activities of the Breast Care Center.
- » ACS' standards are established, implemented, monitored, evaluated, achieved and documented to ensure Commission on Cancer and NAPBC accreditation.
- » The rectal cancer program director presents annually to the cancer committee for the National Accreditation Program for Rectal Cancer.

CANCER COMMITTEE MEMBERS

Edward Levine, MD, Chair \ Surgical Oncology

Typhany Morrison-Brooks \ Cancer Services

Akiko Chiba, MD \ Surgical Oncology

Kelly Cronin, MD \ Diagnostic Radiology

Kathy Flowers, MBA, BSN, RN, NE-BC \ Manager, Radiation Oncology

Janet Forrest, MHA, FACHE \ Associate VP, Clinical Operations, Oncology Service Line

Bart Frizzell, MD \ Radiation Oncology

Carl Robert Grey, MD \ Palliative/Supportive Care

Kathryn Greven, MD \ Radiation Oncology

Marissa Howard-McNatt, MD \ Surgical Oncology / Breast Care Center / Cancer Liaison Physician

Inez Inman, BS, RHIT, CTR \ Cancer Registry

Carrie Klamut \ American Cancer Society

Richard McQuellon, PhD, HSP-P \ Psychosocial Oncology and Cancer Patient Support Programs

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

Amy Pace, MSW \ Care Coordination

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

Rebecca Rankin \ Director of Administration, Comprehensive Cancer Center

Jimmy Ruiz, MD \ Hematology/Oncology

Kimberly Stanbery, DNP, RN, OCN, NEA-BC \ Chief Nursing Officer, Comprehensive Cancer Center

Brandy Strickland Snyder, PharmD, MBA, BCOP \ Director II-Hem/Onc & IDS, Pharmacy Service Line

Thuy Vu, MS, CGC \ Genetic Counselor

Wendy Watson, RD, CSO, LDN \ Nutritionist

Stacy Wentworth, MD \ Medical Director, Survivorship Program/Clinic

Kate Winterbottom, MS, MPH, CCC-SLP \ Speech-Language Pathologist

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



2020
cancer
activities



More than 450 patients were seen in the survivor's clinic making it the busiest year to date.

BREAST CARE CENTER

The multimodality Breast Care Center (BCC) celebrated its 20th anniversary in January 2020. COVID-19 brought many challenges to the community and our patient population. In 2020, 340 new patients were seen with breast cancer in the BCC. The center's goal is to provide state-of-the-art care for the full spectrum of breast diseases in a patient-focused environment. All new cases are reviewed by our multimodality team with the mammographers, genetic counselors, a radiation oncologist and other oncologists before the patient is 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. The BCC is accredited by National Accreditation Program for Breast Centers (NAPBC).

Our breast surgery team consists of two breast surgery-trained physicians: Marissa Howard-McNatt, MD, as the director of the center, and Akiko Chiba, MD. Edward Levine, MD, our division head and surgical oncologist, also sees breast cancer patients. Our medical oncology team is represented by Alexandra Thomas, MD, who is the leader of the breast hematology oncology division. She is also the co-leader of the breast disease-oriented team, along with Dr. Howard-McNatt. The other breast medical oncologists include Susan Melin, MD, Katherine Ansley, MD, Emily Douglas, MD, Steven Sorscher, MD, and Heidi Klepin, MD, in the breast hematology and oncology section. Doris Brown, MD, PhD, heads the breast radiation oncology section.

The BCC enjoys one of the best payer mixes in the institution and competes well within Forsyth County for patients. In late

2019, Dr. Chiba started a high-risk breast clinic at Wake Forest Baptist Health High Point Medical Center. She has grown the clinic during this year and is working with High Point mammographers and medical and radiation oncologists to increase the multidisciplinary care of breast cancer patients in the region. Through her efforts, she saw 60 new breast cancer cases at High Point in 2020. We look for further growth at High Point Medical Center in the coming year.

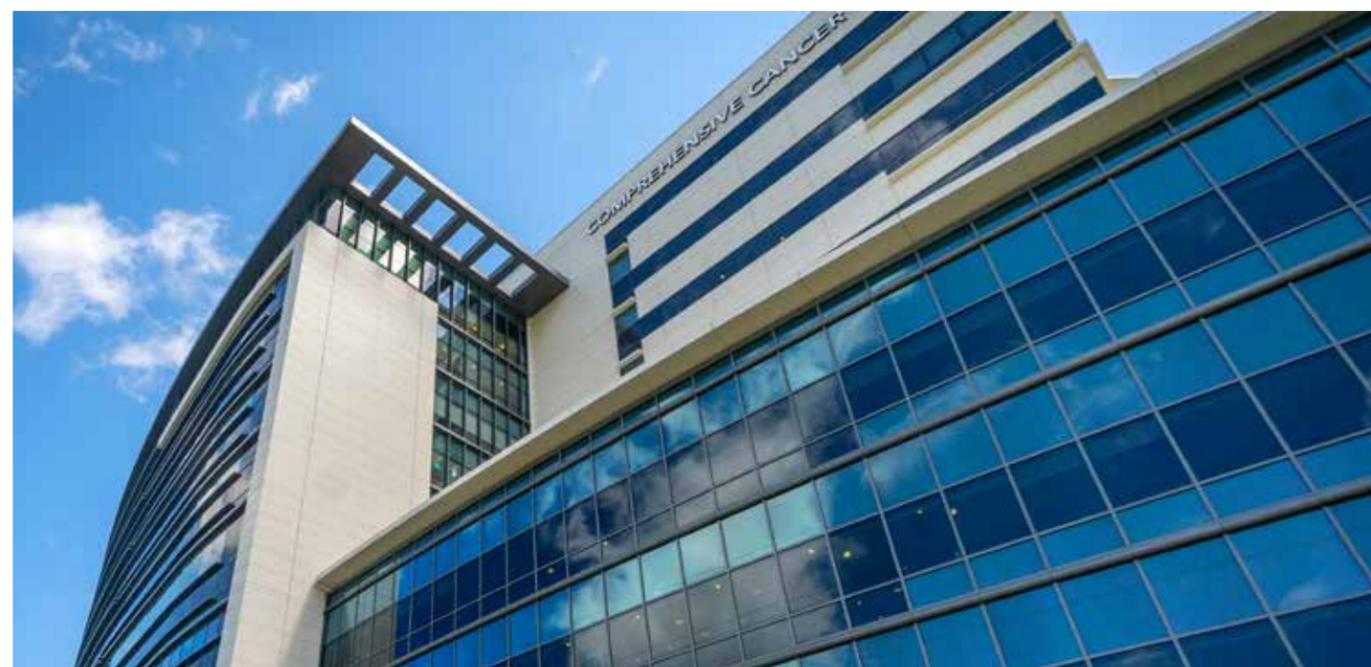
We have updated and continue to expand our outpatient breast surgery at Outpatient Surgery – Clemmons. This has been enhanced by the SAVI SCOUT® surgical guidance system. The system uses electromagnetic wave technology to detect a reflector that is placed in the target tissue days to weeks prior to surgery. We have also been using Magtrace® to help in identifying sentinel lymph nodes. The Magtrace® lymphatic tracer is a liquid used for sentinel node biopsies. Detected by our Sentimag® localization system, this is a non-radioactive tracer used to identify the sentinel lymph node. Both techniques allow us to perform breast cancer surgeries at our off-campus outpatient facilities.

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 provides

monitoring of these patients as well as in-depth psychosocial and health maintenance of these women with high-risk cases. The benign breast clinic in Clemmons saw a total of 200 patients in 2020.

The BCC hosted the 15th Annual Breast Cancer Symposium virtually in October 2020. Lectures covered a wide range of topics, from genetics and imaging to treatment and survivorship issues for breast cancer patients. The event provides continuing education to community providers with the goal of improving health care for those with breast disease. We hope to return to our in-person meeting in 2021.

Research is a key component of the BCC, which actively supports cooperative group breast trials from the NRG Oncology, the Alliance and SWOG Cancer Research Network. We are also an I-SPY clinical trial site and are currently enrolling patients into this multi-arm novel trial. The BCC also has a variety of institutional research initiatives that have led to several publications in prestigious journals, including Annals of Surgical Oncology, during the past year, and several presentations at national meetings including the Southern Surgical Association, Society of Surgical Oncology Annual Cancer Symposium, ASCO 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 the needs of patients and family members are addressed while in the hospital. Arrangements for post-discharge care are coordinated by the RN case manager or social worker. Services may include crisis intervention and counseling, referrals to home health or DME (durable medical equipment), referrals to hospice or other resources, and skilled facility or rehabilitation placements.

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 crisis intervention, assistance with transportation to and from medical appointments, referrals to local resources, and information regarding medication assistance programs.



CANCER PREVENTION AND CONTROL RESEARCH PROGRAM

The Cancer Prevention and Control (CPC) Program is focused on scientific discovery across the cancer continuum that translates into clinical, community and policy strategies to improve cancer outcomes. Program members prioritize research relevant to the Wake Forest Baptist Comprehensive Cancer Center (WFBCCC) catchment area which includes 4.1 million residents in 58 counties in North Carolina, Virginia and West Virginia.

The CPC Program conducts locally relevant research that is rigorous and translatable research across three specific aims:

- 1) Improve health behaviors associated with reduced risk of cancer incidence, morbidity, and mortality
- 2) Enhance quality of life and reduce symptom burden for survivors through the development of optimal supportive care interventions
- 3) Advance cancer care delivery by discovering strategies to improve the effectiveness and implementation of best and promising practices across the continuum of care

The CPC Program is the primary scientific home for the Wake Forest NCI Community Oncology Research Program Research Base (WF-NCORP-RB), the ECOG-ACRIN NCORP Research Base, a new NCI P50 Implementation Science Center on Cancer Control, and a multi-institutional NIDA U54 on tobacco regulatory science.

Our program includes 45 scientific members, representing 16 departments. In 2020, CPC Program members received a total of \$13M in cancer-focused, peer-reviewed funding (direct costs), of which \$8M (62%) was from NCI and \$5M (38%) from other NIH sources. In 2020, the CPC Program conducted more than 60 clinical and/or community-based research studies. Some of the major ongoing projects include:

PRIMARY PREVENTION AND EARLY DETECTION OF CANCER

- » Evaluating New Nicotine Standards for Cigarettes
- » Effective Communication on Tobacco Product Risk and FDA Authority
- » 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 Social Networks to Improve Physical Activity and Weight Loss in Latino Parents
- » Mobile Health Intervention for Family Smoking Cessation in Romania
- » Tobacco Use During the Transition to Adulthood
- » Photoactivatable Ligands for Nicotinic Optopharmacology
- » Nicotinic Receptor Gene Editing Vectors
- » Nicotinic Acetylcholine Receptor Function in the Mesolimbic Dopamine System
- » Identifying Nicotine Withdrawal Mechanisms Hidden Within Habenular Complexity
- » Evaluating the Impact of Waterpipe Tobacco Marketing Claims on Young Adults
- » Consumer Perceptions of Health Claims in Vape Shops
- » Take a Break (TAB): mHealth-assisted Skills Building Challenge for Unmotivated Smokers
- » Health Messaging to Motivate Quitline Use and Quitting (M2Q2)
- » Translational Approaches to TMS Treatment Development for Smoking
- » Synaptic Correlates of Vulnerability and Resilience to Alcohol-use Disorders
- » Wake Forest Translational Alcohol Research Center
- » Systems Genetics to Identify Neuronal Genes for Diet-Induced Obesity
- » Increased Monitoring of Physical Activity and Calories with Technology
- » A Coordinated Parent/Child Dyad Weight Loss Intervention: Dyad Plus
- » War of Attrition: Predicting Dropout from Pediatric Weight Management

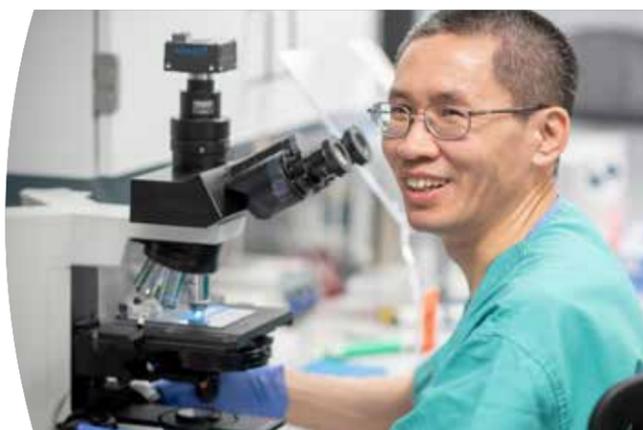


SURVIVORSHIP

- » A Prospective Study of the Impact of Breast Cancer on Symptoms and Functioning
- » A Stepped-care Telehealth Approach to Treat Distress in Rural Cancer Survivors
- » Work Ability in Young Adult Survivors: A Quantitative Investigation
- » Understanding and Predicting Fatigue, Cardiovascular Decline and Events After Breast Cancer Treatment
- » Prepare to Care, A Supported Self-Management Intervention for Head and Neck
- » Optimizing Health-related Quality of Life Measurement in Adolescent and Young Adults
- » Influence of Prostate Cancer Treatment on Work Experience with Focus on Race and Income
- » EHealth Mindful Movement and Breathing to Improve Gynecologic Cancer Surgery Outcomes
- » Targeting IRE-1A to Protect Against Radiation Therapy-induced Bone Loss
- » Brain Mechanisms Supporting Mindfulness Mediation-based Chronic Pain Relief
- » Optimizing an Emotion Regulation Intervention to Enhance Well-being Among Young Adult Cancer Survivors
- » Cellular Senescence: A Novel Mechanism of Doxorubicin-Induced Cardiotoxicity

EFFICACY AND IMPLEMENTATION OF BEST AND PROMISING CPC PRACTICES

- » Effectiveness and Implementation of mPATH-CRC: A Mobile Health System for Colorectal Cancer Screening
- » Implementation of Smoking Cessation Services within NCI NCORP Community Sites with Lung Cancer Screening Programs
- » The Quit Kit: Pilot test of a Novel, Clinic-based Strategy to Promote Smoking Cessation
- » Effect of a Personalized Web-Based Lung Screening Decision Aid on Screening Decisions and Outcomes
- » Assessing Efficacy and Implementation of an EHR Tool to Assess Heart Health Among Survivors
- » Technology-Based Intervention for Lung Cancer Caregiver Support
- » iDAPT: Implementation & Informatics-Developing Adaptable Processes and Technologies for Cancer Control
- » A Personalized Digital Outreach Intervention for Lung Cancer Screening



A full range of surgical options for gynecologic cancers is offered, including radical cytoreductive and exenterative procedures as well as minimally invasive surgery whenever feasible.

GYNECOLOGIC ONCOLOGY

As an integral part of the Comprehensive Cancer Center, the Division of Gynecologic Oncology provides comprehensive care for patients with pre-malignant and malignant gynecologic disease.

This includes surgical management, chemotherapy and radiation therapy in conjunction with colleagues in radiation oncology. There is a strong collaborative relationship with surgical oncology, medical oncology and interventional radiology. In 2019, Gynecologic Oncology treated approximately 300 newly diagnosed gynecologic malignancies, predominantly diseases of the uterine corpus and ovary.

The Division of Gynecologic Oncology provides expert consultation and management of gynecologic malignancies diagnosed regionally including the

Comprehensive Cancer Center's 19-county service area. Evaluation at outreach clinics is offered in High Point, Hickory, Lexington and Statesville to allow patients improved access to subspecialty cancer care. Inpatient and outpatient care is coordinated by a nurse navigator, three nurse practitioners as well as additional dedicated nursing and administrative support staff.

The full range of surgical options for gynecologic cancers is offered including radical cytoreductive and exenterative procedures as well as minimally invasive surgery whenever feasible. Under the leadership of Michael Kelly, MD, laparoscopic and robotic-assisted surgical techniques are performed by three superb surgeons. This approach is now standard of care for many patients with gynecologic malignancies noting a substantial reduction

in postoperative morbidity. As a result, many patients can be discharged the same day or within 24 hours of surgery. Early recovery after surgery (ERAS) is a major focus in the surgical management of gynecologic malignancies and has reduced hospital length of stay.

Patients with gynecologic cancers are offered participation in clinical trials initiated by investigators at Wake Forest Baptist Health, as well as through national collaborative groups (NRG Oncology and GOG Foundation) and partnerships with industry. Open trials emphasize the treatment of newly diagnosed and recurrent malignancies using novel chemotherapy and biological agents. Two faculty members, Dr. Kelly and Janelle Pakish Darby, MD, MS, are members of the NCI-sponsored NRG Oncology ovary and corpus committees respectively that meet biannually to design and review clinical trials.

The Comprehensive Cancer Center, through Surgical Oncology, is nationally recognized for its peritoneal malignancy program incorporating hyperthermic intraperitoneal chemotherapy (HIPEC). Gynecologic Oncology is presently using this modality in gynecologic malignancies. There is now a protocol incorporating HIPEC in newly diagnosed ovarian and peritoneal cancer. Also a protocol is actively recruiting patients with incorporation of HIPEC and second-look minimally invasive surgery after initial therapy for ovarian and peritoneal cancer.

A dedicated, multidisciplinary tumor board composed of gynecologic oncologists, radiation oncologists and pathologists meet regularly to discuss challenging cases. A weekly quality improvement conference is dedicated to the enhancement of patient care and provides a major teaching opportunity for fellows, residents and students.

The ACME fellowship in Gynecologic Oncology will have a full complement of fellows beginning July 2021. This is a three-year fellowship with the first fellow having started in July 2019. It includes two years of clinical activities and one year of research. Dr. Kelly is the fellowship program director, and Dr. Darby is the associate program director.

David Shalowitz, MD, in addition to his clinical practice, leads the division's research efforts in cancer care delivery and health policy. This involves local, regional and national investigations of gynecologic cancer care delivery including quality improvement initiatives to ensure that patients receive the highest standard of care. Associated with this, Dr. Shalowitz has a major interest and focus on telehealth. He continues responsibilities as chair of the ACOG Committee on Ethics. He represents ACOG on other organization ethics committees including the Society of Gynecologic Oncology.

The Division of Gynecologic Oncology includes:

- » **Samuel S. Lentz, MD** / Professor and Division Director
- » **Michael G. Kelly, MD** / Associate Professor
- » **David I. Shalowitz, MD, MSHP** / Assistant Professor
- » **Janelle Pakish Darby, MD, MS** / Assistant Professor



HEAD AND NECK ONCOLOGY

Head and neck cancer continues to constitute a significant proportion of cancers seen at Wake Forest Baptist Health.

In 2019, 536 patients were seen with cancers of the oral cavity, oropharynx, larynx, salivary gland, sinonasal cavity, skin, thyroid and other head and neck sites, 466 of which were newly diagnosed tumors. Wake Forest's Comprehensive Cancer Center is among the busiest hospitals in the Southeast and Mid-Atlantic in the treatment of head and neck cancer patients, which demonstrates our referring providers' confidence in our team's care delivery. Members of our team have subspecialty training and years of experience focused on the treatment and survivorship of head and neck cancer patients.

The number of patients treated includes a large incidence of oral cavity and laryngeal cancers, most of which are tobacco-related. In addition, our team cares for an increasing population of patients with HPV-associated oropharyngeal cancers, mirroring the national trend.

The coordination of multiple disciplines in the care of head and neck cancer patients is essential. A multidisciplinary Head and Neck Oncology Tumor Board meets weekly and is staffed by representatives of the following departments:

- » Otolaryngology: J. Dale Browne, MD, Christopher Sullivan, MD, Joshua Waltonen, MD, and Hafiz Patwa, MD, (General Head and Neck Oncology / Skull Base Surgery / Thyroid Tumors / Head and Neck Cancer Reconstruction)
- » Radiation Oncology: Kathryn Greven, MD, Bart Frizzell, MD, and Ryan Hughes, MD
- » Medical Oncology: Mercedes Porosnicu, MD, and Thomas Lycan, DO
- » Dentistry Division: Judith Messura, DMD, Gayle Kostyack, DDS, and David Kretzschmar, DDS
- » Pathology
- » 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, didactic lectures are presented, and progress of new or ongoing clinic trials is described.

These conferences facilitate more effective physician consultative planning and management decisions. Involvement of a dedicated head and 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. Approximately 100 microvascular free flap procedures are performed each year.

Minimally invasive surgical techniques available to select patients include endoscopic transoral laser resection of laryngeal tumors and transnasal endoscopic resection of skull base. In addition, we have a robust experience in transoral robotic surgery, especially for the increasingly common HPV-related oropharyngeal cancers.

Advanced protocols using the most up-to-date strategies for radiotherapy, chemotherapy, and immunotherapy 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 underway, 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 that are designed to maximize cure rates while preserving function.



HEMATOLOGY AND ONCOLOGY

CLINICAL CARE

The Section on Hematology and Oncology provides both inpatient and outpatient specialty care to a diverse population. It serves racially and ethnically diverse patients from urban and rural communities. Outpatient clinics are held five days a week and staffed by a multidisciplinary team of providers that includes 51 MD and PhD faculty, 15 clinical fellows and 33 advance practice providers. They are supported by clinical pharmacists, nurses, social workers, dietitians and other essential staff. Outpatient chemotherapy is offered six days a week and administered in a specialized infusion center. Hematology-focused faculty 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 smooth transition between inpatient and outpatient care is a major goal of our efforts to provide outstanding patient care. Its hospital-based cancer care is centered around five inpatient services housed in the Cancer Center and provides two consultative services across Wake Forest Baptist Health:

- » Two general hematology and oncology services
- » A specialized leukemia service
- » A stem cell transplant and cellular therapy service
- » A hospitalist-run service that pairs hospitalists and hematologist/oncologist consultants to care for patients with medical complications of their malignant and hematologic disorders
- » The consult service has two separate teams: malignant/non-malignant hematology and solid tumor services

In addition to the inpatient and outpatient activities at Wake Forest Baptist Medical Center in Winston-Salem, Hematology and Oncology faculty maintain full-time, full-service practices in the community-based outreach sites of Clemmons, Elkin, High Point, Lexington, Mount Airy, Wilkes and Statesville. Faculty also provide physician services at Advent Health in Hendersonville.

Tumor boards bring together multidisciplinary teams to provide the best care for patients with cancer. The section's physicians are critical to the success of tumor board conferences that emphasize communication and consensus recommendations. These conferences exist for breast, colon, head and neck, leukemia, lung, lymphoma and prostate cancers. Using virtual videoconferences allows providers from Wake Forest Baptist community-based practices access to the tumor boards and the full spectrum of hematologic and oncologic expertise.

In addition, the section has a nationally recognized Psychosocial Oncology Program. It was established more than two decades ago and is an essential component for excellence in cancer care. Patients also benefit from a multidisciplinary Precision Oncology Program that leverages 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:

- 1) Individualize the care of patients with cancer and blood disorders
- 2) Meet the medical, emotional and informational needs of patients and their families
- 3) Provide access to cutting-edge clinical trials

EDUCATION

The section maintains a commitment to training the next generation of hematologists and oncologists. The three-year Wake Forest Baptist Hematology-Oncology Fellowship Training Program provides rigorous and comprehensive training for 15 fellows. It is accredited by the Accreditation Council for Graduate Medical Education. The section is committed to the educational mission of the Wake Forest School of Medicine and plays a major teaching role 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 postdoctoral fellows involved in cancer-related bench or clinical research activities.

A strong academic and clinical affiliation exists between our section and the W.G. Hefner VA Medical Center in Salisbury, N.C., and the VA's Kernersville Health Care Center in Kernersville, N.C. The physicians at the VA are joint-appointed faculty members and allow for retired military service members to receive hematology and oncology subject matter expertise and access to cutting-edge treatment on or off study protocols. The VA provides a learning environment for the section's hematology-oncology clinical fellows. The VA clinic in Kernersville is a major clinical site for our hematology and oncology fellows' continuity clinics.

As part of our educational mission, section faculty 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. This symposium facilitates the dissemination of new knowledge to busy hematologists and oncologists in our region.

RESEARCH

The section's providers are involved in clinical and translational research allowing patients access to the most effective treatments and clinical trials. With advances in biologic agents and immunotherapy, the value of subspecialty care and access to novel agents through clinical trials has continued to increase. Our physicians emphasize clinical research and the multidisciplinary care of patients with all types of cancer.

Specific areas of research focus and clinical expertise include brain cancer, breast cancer, bone marrow and stem cell transplants, head and neck cancers, gastrointestinal cancers, genitourinary cancers, specialized geriatric oncologic care, leukemia, lymphoma, lung cancer, melanoma, myelodysplasia, myeloma and sarcoma.

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

- » The Alliance for Clinical Trials in Oncology
- » NRG Cooperative Group
- » Adult Brain Tumor Consortium
- » The Wake Forest Baptist National Cancer Institute Community Oncology Research Program (NCORP) Research Base (NCORP is a National Cancer Institute-funded cooperative group headquartered at Wake Forest Baptist that develops and leads cancer prevention and control clinical trials and cancer care delivery research protocols within a network of community oncology practices across the country.)

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 activity efforts include:

- » Finding novel therapeutics for patients with acute leukemias, and understanding the mechanisms of resistance of current leukemia therapies
- » Developing new treatment strategies for patients with melanoma
- » Identifying novel therapeutics to treat myeloma

With advances in biologic agents and immunotherapy, the value of subspecialty care and access to novel agents through clinical trials has continued to increase.



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 40 to 50 new patients with this diagnosis are evaluated and treated annually in our institution. 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 30 years and is performed by Craig Greven, MD, 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 Charles Rice, 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 departments of Neurosurgery, Otolaryngology and Hematology / Oncology to provide 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, Dr. Rice works 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 Matthew Giegengack, MD, 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. In addition to treatment of neoplasms, Dr. Giegengack is an expert in ocular surface reconstruction.

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

ORTHOPAEDIC ONCOLOGY

Orthopaedic Oncology, part of the Cancer and Musculoskeletal service lines, is committed to the comprehensive and specialized care of patients with benign and malignant 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 and can see new patients within 72 hours of referral. Colleagues in Medical Oncology, Radiation Oncology, Musculoskeletal Radiology and Pathology are immediately available for consultation and collaboration, contributing greatly to the multidisciplinary 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, vascular 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 typically starts with a biopsy to determine the type of tumor. Most biopsies are now performed as small needle biopsies in the office, avoiding the cost, risk, pain and inconvenience of an open biopsy in the operating room. Patients will often know their diagnosis on the same day as their office biopsy, facilitating rapid implementation of treatment.

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

There are three primary categories of tumors treated by Orthopaedic Oncology: soft-tissue tumors, bone tumors, and bone lesions.

Radiation Oncology has further developed our multidisciplinary 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. Being part of one Comprehensive Cancer Center ensures that we have seamless communication, not only to improve patient care but also to improve the patient experience. These collaborations also lead to innovative research with colleagues in several other departments and other academic centers. The Orthopaedic Oncology team recently completed a multicenter clinical trial that 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 approved by the Food and Drug Administration, and this device has created a new and minimally invasive surgical option for patients that previously did not exist.

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.

PALLIATIVE / SUPPORTIVE CARE

Jennifer Gabbard, MD, Carl Grey, MD, and Tiffany Statler, PA-C, available on the fourth floor of the Comprehensive Cancer Center and via telehealth, assist patients in managing uncontrolled symptoms related to their cancer in general or related to side effects of treatment, such as pain, fatigue, nausea, shortness of breath, loss of appetite, anxiety, depression, neuropathy (nerve pain), etc., that can interfere with everyday functioning.

They also can address emotional issues, such as the stress and anxiety of having a serious illness. The goal of the clinic is to provide a safe haven for patients and their families and to improve overall quality of life and function. The Supportive Care team is also available upon request for patients who are admitted to the hospital. Interested patients should speak with their primary oncologist for a referral. If you would like to request an appointment with Supportive Care, please call us at (336) 713-9088 and leave a message.



Jennifer Gabbard, MD



Carl Grey, MD



Tiffany Statler, PA-C

PATIENT FAMILY ADVISORY COUNCIL

The Patient Family Advisory Council of the Comprehensive Cancer Center started in May 2013 and is dedicated to bringing patient volunteers and medical center staff together to enhance and promote our family-centered care philosophy.

Patients or family members share personal experiences and perspective with the goal of improving the overall care and experience. The team partners to improve policy and procedures, gives valuable input to various initiatives across Wake Forest Baptist Health and participates in giving back to others.

Recruiting of family advisors has been a major focus of the council. Three new members have joined us for a total of seven family advisors.

The council has not met since March 2020 due to Covid-19 restrictions.





Brenner Children's Hospital contains 16 private inpatient beds, six outpatient clinic rooms and a day hospital/observation area.

PEDIATRIC ONCOLOGY

The Pediatric Oncology Program sees approximately 70 new oncology patients per year. A dedicated hematology/oncology unit in Brenner Children's Hospital contains 16 private inpatient beds, six outpatient clinic rooms and a day hospital/observation area. Patients come from the Piedmont and central/western North Carolina, as well as southwest Virginia and southern West Virginia. Most referrals come from pediatricians and family practitioners.

Pediatric Oncology is staffed by six pediatric hematologists/oncologists:

- » Tom McLean, MD, is section chief of Pediatric Hematology/Oncology, and medical director of the inpatient and outpatient pediatric hematology/oncology services.
- » Alex George, MD, PhD, oversees the pediatric hemoglobinopathy and benign hematology programs. His primary interests are in pediatric hematology and hemoglobinopathies, including sickle cell anemia.
- » Kevin Buckley, MD, practices general pediatric hematology/oncology, and is interested in infections in immuno-compromised populations and immune reconstitution after chemotherapy. In addition to pediatric hematology/oncology, he is also board certified in pediatric infectious diseases.
- » Thomas Russell, MD, practices general pediatric hematology/oncology and has expertise in pediatric sarcomas. He is also director of the Pediatrics Residency Program.
- » David Kram, MD, practices general pediatric hematology/oncology and is the director of the Pediatric Neuro-oncology Program, working in collaboration with members of the Cancer Center's Brain Tumor Center of Excellence.
- » Cristina Fernandes, MD, practices general pediatric hematology/oncology and is the director of the Pediatric Oncology Long-term Follow-up Program.

The seventh faculty member in Pediatric Hematology/Oncology is Marcia Wofford, MD, Associate Dean for Student Affairs for Wake Forest School of Medicine.

Pediatric Oncology has four pediatric nurse practitioners, two physician assistants, three doctors of pharmacy, two clinical research associates, and one research nurse. 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), staffed with a full-time counselor/director, focuses on patient education as well as many levels of individual and group, social and psychological support for on-therapy and off-therapy patients and families.

Pediatric Oncology is an active member of the Children's Oncology Group (COG). Pediatric Oncology also 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 into COG clinical trials, although section members are also involved in several investigator-initiated research projects, including an innovative male fertility program.

PHARMACY

Oncology pharmacists serve an important role on the multidisciplinary team for cancer patients and provide medication management services across the care continuum. Pharmacists work closely with other health care professionals to develop institutional guidelines and assist with evidence-based decisions for treating patients. Pharmacy staff also assist patients through transitions of care, oral chemotherapy management, infusion therapy and self-care at home.

Advancements in cancer treatments have become more complex involving immunotherapy, targeted therapies and pharmacogenomic testing. Aggressive approvals by the Food and Drug Administration in 2020 resulted in 21 new therapies for cancer and blood disorders.

In the acute care setting, the pharmacy team completes admission medication reconciliation, patient education, discharge medication review, and facilitates delivery of medications to the bedside. The pharmacy team is actively involved with the patient care team in ensuring that medications are appropriate—patient safety is a top priority.

In the ambulatory setting, the pharmacy team supports safe and effective processing of chemotherapy and supportive care infusions in eight infusion clinics. Using several important safety checks in verifying and compounding chemotherapy, the pharmacy team prepared approximately 85,000 patient-specific hazardous and nonhazardous infusions for cancer patients in fiscal year 2020, with approximately 74,000 for ambulatory clinics and approximately 11,000 inpatient infusions.

The Pharmacy Department is a global leader in adopting automated intravenous medication preparation for hazardous chemotherapy drugs. Using high-precision robotics helps ensure safety in preparation for patients and family members, and it protects employees. Over the last year, 90% of all chemotherapy was made by automation at the Wake Forest Baptist Health oncology infusion clinic on the Winston-Salem campus.

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

In the outpatient setting, Wake Forest Baptist Health's community and specialty pharmacies provide home therapies, drug-specific pharmaceutical care plans and routine patient follow-up. Pharmacists secure access to limited distribution oral oncology agents through Wake Forest Baptist Health-operated pharmacies. Over 32,000 prescriptions were dispensed in the Cancer Center community pharmacy in 2020, with over 8,300 prescriptions for oral chemotherapy agents. The percentage of oral chemotherapeutic agents filled in the Cancer Center pharmacy grew in 2020 from 16% to 25%, representing continual cancer care growth and integration.

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 who assist with prior authorizations and other medication-related needs and provides on-call services 24/7.

The Department of Pharmacy also fulfills an educational and research mission. The Investigational Drug Service provided oversight of approximately 359 (55% oncology) investigational drug clinical trials through protocol review and research committee participation in fiscal year 2020. The pharmacy team has been integral to support Phase I clinical trials and expansion of these services as well. Pharmacy staff are responsible for preparing, verifying orders, dispensing, and managing inventory of investigational medications to ensure compliance with research standards. The team works closely with research coordinators and the medical team to provide patient education and other pharmacy needs.

The postgraduate specialty pharmacy and oncology residency programs train pharmacists to care for cancer patients. Pharmacists also educate medical students and residents through participation on the patient care team. The Department of Pharmacy works with three regional schools of pharmacy, and learners are also incorporated into the pharmacy care model.

Over 32,000 prescriptions were dispensed in the Cancer Center community pharmacy in 2020, with over 8,300 prescriptions for oral chemotherapy agents.

PHILANTHROPY

REMARKABLE BREAKTHROUGHS BEGIN WITH VISIONARY DONORS

Even in light of the uncertainty of the pandemic, philanthropic support for the Comprehensive Cancer Center was robust in 2020. The thriving generosity of individual donors, along with corporate and foundation support, demonstrate a remarkable commitment to our mission and a reminder that the need for exceptional cancer care did not pause during the global crisis.

In 2020, patients, families, advocates and friends contributed over \$5.5 million to the Cancer Center at Wake Forest Baptist Health. This support impacts every area of the Cancer Center, from cutting-edge research and clinical care, to direct patient aid and the education of the next generation of oncologists and caregivers.

In addition to contributions of cash or assets, one visionary way to support the Cancer Center is through a bequest intention. A charitable bequest is a provision in your estate plans, such as a will, that designates part of the estate will go to charity. In 2020, the Cancer Center was notified of several thoughtful bequest intentions that will certainly leave a legacy of philanthropy. One such gift, designed to fuel future cancer research breakthroughs, was given by former Cancer Center board member Merle Andrews and her husband Larry Andrews.

"We have made charitable bequests to benefit organizations that we care about and believe in. Our knowledge of the Cancer Center and the work of the researchers and oncologists gives us confidence that our gift will be in the best hands and make a real impact," said Merle Andrews.

Terri and Louie Niederhammer also felt the calling to make an impact on cancer patients. In addition to making a gift to establish an endowed fund, the Niederhammers elected to also make a companion gift through their estate. Their fund, named the Edelweiss Fund to honor Louie's heritage and cancer journey, will offer direct financial assistance to brain tumor patients in need from Western NC and beyond.

As Terri Niederhammer pointed out, "The care that Louie received inspired us to want to give back. It's exciting to know that the Edelweiss Fund will support brain tumor patients long into the future and that others can also contribute to the cause. We were happy to start the fund and hope that it will inspire others to also get involved."

For more information about how you can support Wake Forest Baptist Health's Comprehensive Cancer Center, please contact Allison Brouillette at (336) 716-2275 or abrouill@wakehealth.edu.



Clinical and basic research activities are funded by grants totaling \$1.3 million from the NIH, NCI, foundations/societies and industry.



RADIATION ONCOLOGY

Radiation Oncology continues to grow as it strives to become a top 10 radiation oncology department nationally. There are currently 14 radiation oncologists, 10 radiation physicists and three PhD research faculty in the department.

The department is located in the outpatient Comprehensive Cancer Center building and provides multidisciplinary cancer care from medical and surgical oncology as well as diagnostic radiology. With in-department CT/PET and MRI scanners as radiation therapy simulation devices, the department is one of the most technologically sophisticated in the world.

The Radiation Oncology Residency Training Program attracts high-quality residents and currently has seven serving. The ratio of applicants to positions is about 100-to-1. 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 a National Institutes of Health (NIH)/National Cancer Institute (NCI) T32 Training Grant in 2005 that ended in 2015. Four trainees have completed the program, which focuses on translational radiation oncology for postdoctoral fellows in clinical radiation oncology, biology and physics.

Clinical and basic research activities are funded by grants totaling \$1.3 million from the NIH, NCI, foundations/societies and industry. 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 Program was initiated in 1999 and continues to be one of the busiest in the United States, treating approximately 38 patients per month. The Stereotactic Body Radiotherapy Program is one of a select few in the nation, with more than a decade of experience treating more than 6,000 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.

Radiation Oncology has four affiliated practices in North Carolina that are staffed with physicians and physicists from Wake Forest Baptist Health: Hugh Chatham Memorial Hospital in Elkin, Wake Forest Baptist Health Lexington Medical Center Radiation Oncology, Wake Forest Baptist Health High Point Medical Center Radiation Oncology and Iredell Memorial Hospital in Statesville. In total, Radiation Oncology and its affiliated practices treat approximately 200 patients per day with radiation therapy, making this the largest provider of radiation therapy services in the Piedmont Triad and north central North Carolina.

In the past year, the main campus and regional practices consulted with over 3,500 patients, saw 6,000 in follow-up and treated approximately 3,000 with external beam radiation therapy and approximately 1,900 with special procedures including Gamma Knife/Stereotactic radiosurgery, prostate and gynecologic brachytherapy, total body irradiation and image-guided radiation.

In summary, the Department of Radiation Oncology is well positioned locally, regionally, nationally and internationally as a leader in the treatment and research of radiation therapy for malignant and select benign diseases.



The SCTCT Program has performed transplants on more than 2,600 patients since the first transplant was performed in May 1990.

STEM CELL TRANSPLANT AND CELLULAR THERAPY PROGRAM

The Stem Cell Transplant and Cellular Therapy (SCTCT) Program has performed transplants on more than 2,600 patients since the first transplant was performed in May 1990. Patients from the Piedmont region and surrounding states have access to stem cell transplant and cellular therapies including over 15 clinical trials involving stem cell transplant and cellular therapy that positively influence patient outcomes. The program performs the majority of the autologous transplants in the outpatient setting, which has been shown to improve the quality of the patient experience and decreases the overall financial burden of care. The program works closely with referring providers and health systems to ensure a smooth transition back to the treating provider at the end of the transplant.

The SCTCT Program consists of a multidisciplinary team that includes physicians, advanced practice providers, pharmacists, nurse coordinators, financial coordinators, psychologists, social workers, nurses, dieticians, physical therapists, the stem cell processing team, the apheresis team and the HLA lab. The attending physicians serve as mentors for our internal fellowship program. The SCTCT Program is delighted to welcome Jonathan Lambird, MD, MBA, to the program as a specialist in multiple myeloma and allogeneic transplant and Olivia Ray, PA-C, as one of our advanced practice providers. Program Director Dianna Howard, MD, also serves as co-executive director of the Cancer Service Line at the Comprehensive Cancer Center.

Several members of the SCTCT team have active roles within national organizations including the American Society for Transplantation and Cellular Therapy, American Society of Hematologists, the Hematology Oncology Pharmacy Association and the Oncology Nursing Society. In 2020

alone, the program collectively had 10 poster presentations accepted at the American Society for Transplantation and Cellular Therapy national meeting as well as a podium presentation at ONS Congress 2021. These presentations represent the multiple disciplines throughout the program. The American Society for Histocompatibility and Immunogenetics recognized our HLA lab as one of the winners of the 2021 Human Immunology Best Papers of 2019 Award for the publication of "New HLA Alleles Discovered by Next-generation Sequencing in Routine Histocompatibility Lab Work in a Medium-Volume Laboratory."

The SCTCT team successfully implemented two major projects in 2020. The Chimeric Antigen Receptor Therapy (CAR-T) Program treated its first patient in August 2020. Two patients have completed the therapy with plans to grow this program in 2021, adding two additional therapies for lymphoma and multiple myeloma. The program also worked to develop and implement a state-of-the-art data management and reporting tool for quality data collection and submission.

Our apheresis unit successfully relocated to a new space within the Medical Center in October 2020. During this transition period, a new check-in process was initiated, multiple new staff members were trained, and new policies and procedures were implemented all without compromising patient care. Our program continues to participate with the National Marrow Donor Program as an Apheresis Center and Marrow Collection Center for unrelated BeTheMatch donors, providing quality stem cell products to transplant patients worldwide.

The SCTCT Program has been accredited by the Foundation for Accreditation of Cellular Therapy continuously for 20 years and maintains a quality management plan that monitors and measures all aspects of cellular therapy. Strong performance and quality metrics have continued to allow the SCTCT Program to be included in the excellence networks with many of the larger insurer groups. The quality initiatives include reaching unmet needs of underserved cancer patient populations; growing community partnerships; increasing survivorship programs to address post-cellular therapy health concerns; identifying outcome predictors to assess fitness for transplant in patients older than 65 and expanding our alternative donor program and participation in clinical trials.

The Stem Cell Transplant and Cellular Therapy Program includes:

- » Dianna Howard, MD, Professor, Director of the Stem Cell Transplant and Cellular Therapy, Co-Executive Director of the Cancer Service Line, Comprehensive Cancer Center
- » Rakhee Vaidya, MD, Assistant Professor, Director of the Lymphoma Program
- » Cesar Rodriguez, MD, Associate Professor
- » Mary Beth Seegars, MD, Assistant Professor
- » Jonathan Lambird, MD, Assistant Professor

Since the program was launched in 2017, there have been 632 patients enrolled, with 536 completing full evaluations.



CANCER SECOND OPINION PROGRAM

The Cancer Center Second Opinion (C2O) program was initiated February 2017 under the direction of the Oncology Service Line and continues to flourish today. The mission of the program is to create an exceptional patient experience by providing patients diagnosed with cancer outside our facility/affiliates with a complete and expedited second opinion; empower patients with knowledge of their condition and treatment options; and elicit comprehensive clinical recommendations that lead to the highest quality and timely treatment options.

Our team consists of a clinical navigator, patient advocate and medical records specialist. This team provides initial intake, ensuring medical records are gathered and reviewed and provide a "concierge" service for the patient. In conjunction with the multidisciplinary cancer specialists and their clinic staff the patient is provided exceptional service, ending with a personalized treatment plan.

Since the program was launched in 2017, there have been 632 patients enrolled, with 536 completing full evaluations. Of these patients, 48% have chosen to stay for all or a portion of their care at our Cancer Center. There have been roughly 4% of second opinion patients with a diagnosis change while coming through this program with 26% of the patients having a different treatment recommendation compared to their outside provider.

It continues to remain evident that the Cancer Center Second Opinion program is successful in providing patients an exceptional service while providing patients access to our great resources at the Cancer Center.

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 diseases of the breast, endocrine tumors, melanoma and sarcoma as well as the full spectrum of gastrointestinal malignancy from esophagus to anus. The service is very busy, with 1,477 major operative cases and more than 8,129 outpatient visits in 2020. The service responded to the challenges of the COVID-19 pandemic, which allowed surgery for cancer to continue throughout the 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 clinic nurses. Edward Levine, MD (chief of the service), Russell Howerton, MD, Perry Shen, MD, Marissa Howard-McNatt, MD, Kostas Votanopoulos, MD, PhD, Clancy Clark, MD, Akiko Chiba MD, and Reese Randle MD, serve as the clinical faculty. Specialized advanced practitioners Jacqueline Doucette, NP, Christin Sequin, NP, and Cheryl Sizer, PA, support the Breast Care Clinic, with surgical oncology care support from Nathan Ogilvie, PA (inpatient), and Stephanie Staley, NP (outpatient).

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 340 new breast cancer cases evaluated in 2020. 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 National Accreditation Program for Breast Centers, and accreditation was renewed for three years in 2018. The BCC facilitates complex multimodality care in a setting that fosters participation in state-of-the-art research trials. Dr. Howard-McNatt is the director of the clinic and supervised an expansion of the clinic to the Clemmons office. In 2019, Dr. Chiba added clinics at High Point to the breast service. The clinical work in breast cancer works hand-in-hand with the disease-oriented breast cancer research team (which Dr. Howard-McNatt co-chairs).

The service is very busy, with 1,477 major operative cases and more than 8,129 outpatient visits in 2020.

In 2020, the BCC cared for 340 cases. The BCC enjoys one of the best payor mixes in the institution, and competes well within Forsyth County for patients. The clinic in Clemmons is doing well and is predominantly for benign breast disease and survivorship; the clinic is nearly full in its ninth year of operation.

Dr. Howard-McNatt updated the biopsy technique for non-palpable breast tumors and expanded breast cancer surgery at our outpatient surgical center in Clemmons.

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. In 2020, we implemented an early recovery after-surgery protocol (ERAS) for esophagectomy patients.

HepatoPancreaticoBiliary (HPB) surgery, which relates to complex liver and pancreas surgery, is 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 HPB service has continued to expand and lead the region for complex consultations. The HPB surgery program performed 124 major cases in 2020. The following is the breakdown of cases:

Hepatobiliary procedures (excluding cholecystectomy): 58. Most cases were performed using minimally invasive techniques (laparoscopic or robotic) with a median LOS of three days.

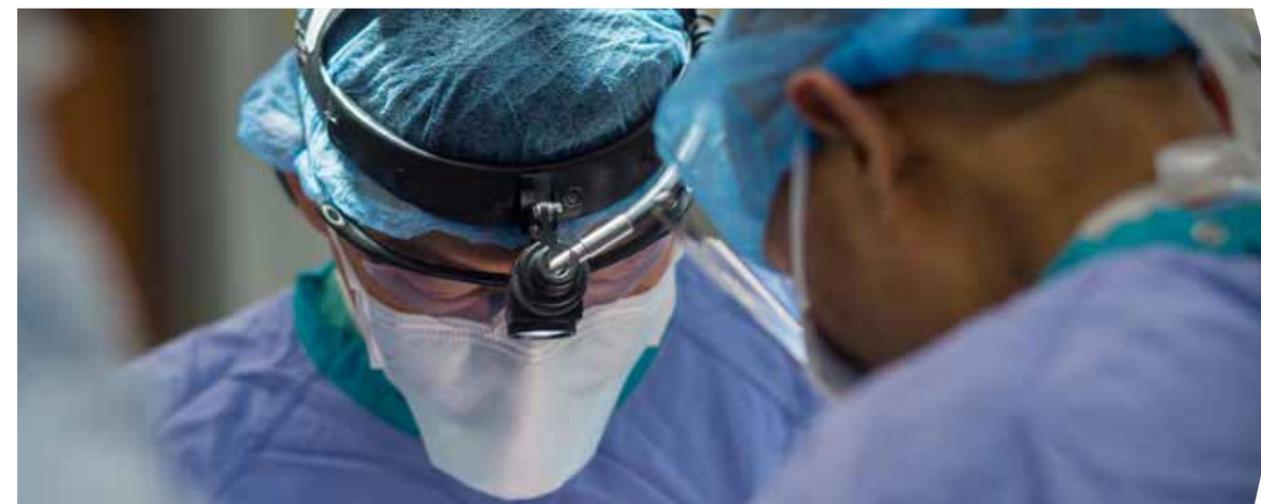
Pancreatic procedures: 66, with 41 being pancreaticoduodenectomy (Whipple procedures). These mortality outcomes are comparable to the best cancer centers in the United States.

The robotic surgery program continues to grow with Dr. Shen recently performing his 100th robotic procedure. This was highlighted by Dr. Shen successfully performing our first robotic right hepatectomy. He re-initiated a hepatic artery infusion/regional chemotherapy program for hepatic metastases from colorectal cancer. This allows for direct intra-arterial delivery of high-dose chemotherapy to unresectable metastases via a pump implanted in the gastroduodenal artery. This procedure can now be performed with minimally invasive techniques. Newer approaches to liver surgery have afforded improved outcomes to not only patients with primary hepatic tumors but those with cancers metastatic to the liver as well. Extensive experience with newer approaches to pancreatic tumors and disease has led to streamlined care plans for patients as well as research initiatives for pancreatic patients.

Dr. Votanopoulos continues his efforts to bring surgical oncology expertise beyond the main campus. He leads the general surgery effort at the Veterans Administration Medical Center in 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. Dr. Votanopoulos has initiated research into using organoids grown from freshly harvested tumor tissue in collaboration with the regenerative medicine team. This has led to several grant awards in 2020.

Dr. Randle joined the faculty this year bringing additional expertise in the care of endocrine tumors to the Surgical Oncology team. He has already expanded the capabilities for treatment of the full spectrum of endocrine tumors of the thyroid and parathyroid. He has also initiated minimally invasive adrenal gland (adrenalectomy) procedures. This has resulted in nearly doubling the number of endocrine tumor resections.

Our Hyperthermic IntraPeritoneal Chemotherapy (HIPEC) Program, led by Dr. Levine, celebrated its 29th anniversary on Dec. 30. Our total experience (now 1,718 cases in 1,551 patients) is truly world class. The program continues to flourish despite several new centers in the region and many more nationally now competing with us. Drs. Levine, Shen, Votanopoulos and now Dr. Kelly in Gynecologic Oncology performed 92 HIPEC cases in 2020. All cases are followed in our prospective data registry, which is one of the largest experiences with this complex modality worldwide. The HIPEC team, led by Dr. Levine and supported by MD Anderson Cancer Center and the University of Pittsburgh, published the first randomized trial for cancer of the appendix (for any stage of disease) in 2018 and a companion study of quality of life in 2019 in the Annals of Surgical Oncology. This effort was supplemented by a study of quality of life in the caregivers of patients undergoing HIPEC procedures, the first manuscript of its kind in these patients. This was presented at the Southern Surgical Association and accepted for publication in 48 hours in the Journal of the American College of Surgeons (DOI: 10.1245/s10434-019-08064-6). The work on appendiceal cancer supported a national survivorship symposium (held virtually this year due to the COVID-19 pandemic) on Sept. 27, 2020.



EDUCATION

Surgical Oncology faculty members are dedicated to teaching the next generation of physicians to care for those with oncologic diseases. Trainees on service are included as part of the team bringing clinical expertise to patients who require cancer staging, treatment and follow-up due to malignancy.

Extensive clinical experience in a tertiary referral setting provides the surgical know-how for dealing with rare and unusual neoplasms. Fellows, house staff and the medical and physician assistant students on the service are extensively involved in multimodality consultations for the care of cancer patients with diseases of the breast, endocrine tumors, melanoma and sarcoma 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 Breast Cancer Center also hosts house officers from Gynecology, Internal Medicine and Family Medicine.

A weekly multidisciplinary/multimodality surgical oncology conference, led by Dr. Levine, meets Fridays at noon in the Cancer Center and serves as the CME-accredited tumor board for the institution. This is supplemented by a CME-accredited HPB tumor conference meeting, led by Dr. Shen, each Tuesday at noon.

We sponsored two major symposia in 2020:

- » The 15th Annual Breast Cancer Symposium was held in Greensboro on Oct. 18, 2020, and had approximately 80 attendees. This day-long session focused on new approaches to breast cancer and breast cancer care, led by Dr. Howard-McNatt. This was held virtually due to the COVID-19 pandemic.
- » This year we sponsored our first Appendix Cancer Survivorship Symposium on Sept. 27, 2020. This was held virtually due to the COVID-19 pandemic. This was led by Dr. Levine and supported by the Universities of Chicago and Utah, with grant funding from the Appendiceal Cancer Pseudomyxoma Peritonei (ACPMP) Research Foundation. We plan to make this an annual event.

Our 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 who have completed the program have obtained faculty positions at Georgetown University, Johns Hopkins (two), Louisiana State University, Eastern Virginia University, the Medical College of Wisconsin, Hofstra University, University of Tennessee-Knoxville and the Mayo Clinic.

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. It is one of only 25 programs in North America to be so honored. In 2020, we graduated/placed our ninth Surgical Oncology fellow (Omeed Moaven, MD) and recruited our 10th and 11th Surgical Oncology fellows (Chris Mangieri, MD, and Cristian Valenzuela, MD).



RESEARCH

Surgical Oncology actively supports research in basic science, translational science and clinical arenas. The surgical oncology research program faculty published 52 individual peer-reviewed manuscripts in 2020. These publications span the gamut from basic science to translational and clinical issues relevant to several tumors. Further, our efforts to make research available to trainees has borne fruit, as nine residents and fellows were co-authors on our manuscripts in 2020. Surgical Oncology also collaborates with investigators in the Alliance and NRG cooperative oncology groups, as well as other members of the Comprehensive Cancer Center, including Public Health Sciences, Exercise Physiology, Gastroenterology, Cancer Biology, Radiology, Nuclear Medicine, Medical Oncology and Radiation Oncology. Clinical trials in association with the NRG are coordinated by Dr. Levine, who serves as the principal investigator.



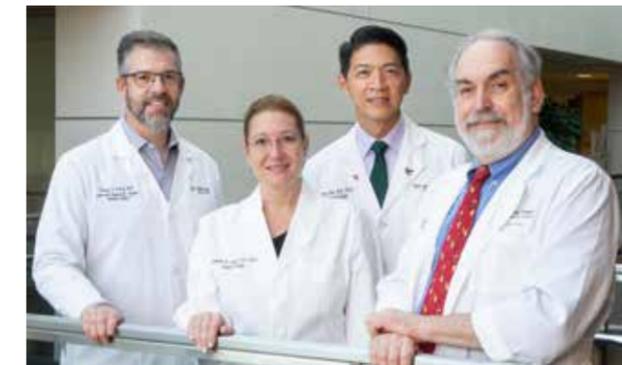
In 2019, Surgical Oncology enrolled nearly 100 patients on treatment protocols and 805 on tissue-procurement studies. The surgical oncology faculty had a total of 20 research protocols open during 2020. Currently, Surgical Oncology clinical and research faculty members hold approximately \$1 million in active extramural and philanthropic funding.

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 organoids in research and published a seminal manuscript on their utility for melanoma. The Wake Forest Organoid Research Program (WFORCE) is sponsored jointly by the Cancer Center and the Wake Forest Institute for Regenerative Medicine. WFORCE has several grants from the VA and the ACPMP Research Foundation with a prestigious, multimillion-dollar NIH R-01 grant awarded in early 2021.

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. Shen led an effort that evaluated the utility of nurse navigators in initiating therapy for patients with pancreatic cancer (Oncology Navigation Decreases Time to Treatment in Patients with Pancreatic Malignancy, *Annals of Surgical Oncology*) which was highly cited in 2020. Dr. Clark has also initiated innovative research evaluating Fitbit data for

predicting outcomes for older patients undergoing major cancer surgery, and in 2019, this novel effort has been supported by two research grants that are ongoing in 2020. Drs. Howard-McNatt and Chiba both published research this year evaluating breast cancer care and treatment.

Drs. Shen, Howard-McNatt and Votanopoulos are co-leaders of the GI, Breast and Melanoma disease-oriented teams, respectively. Dr. Levine remains chair of Wake Forest Baptist's Cancer Committee, senior adviser to the Cancer Center director, institutional principal investigator for the NRG cooperative oncology group and director of the Tumor Tissue Pathology Resource lab (Tumor Bank). Further, Dr. Shen is immediate past president of the North Carolina chapter of the American College of Surgeons and was named co-executive director of the oncology service line. Overall, 2020 was another very productive year for the Surgical Oncology Program.



SURVIVORSHIP PROGRAM

This year, the Comprehensive Cancer Center's Cancer Survivorship Clinic celebrated its one-year anniversary. We also welcomed our 500th patient—Cathy Way, a survivor of a rare type of T-cell lymphoma called Sezary Syndrome. Cathy was treated in our Bone Marrow Transplant Unit four years ago. Members of her treatment team, survivorship clinic staff and Wake Forest Baptist Health CEO Dr. Julie Freischlag celebrated her four years of being cancer-free. Cathy's oncologist, Dr. Dianna Howard, said, "It takes a lot of sacrifice and strong family support to go through the cancer experience and recover. Coming to a survivorship clinic is a part of maintaining wellness after cancer treatment."

Along with bone marrow transplant survivors like Cathy, providers in the Cancer Survivorship Clinic continued to see survivors of breast, gastrointestinal, lymphoma and lung cancers. Even in the midst of a global pandemic, the survivorship clinic saw more than 480 patients, a 30% increase from last year. Patients from 61 counties in three states were seen in person and via telehealth, which was offered as an option for the first time this year. Nearly 800 referrals and orders were entered by Cancer Survivorship Clinic providers to monitor for cancer recurrence or address survivor symptoms and concerns. Patient feedback was overwhelmingly positive with most patients finding their survivorship visit informative and empowering.

Adult survivors of pediatric cancers continue to be seen in the Cancer Survivorship Clinic by the hematology/

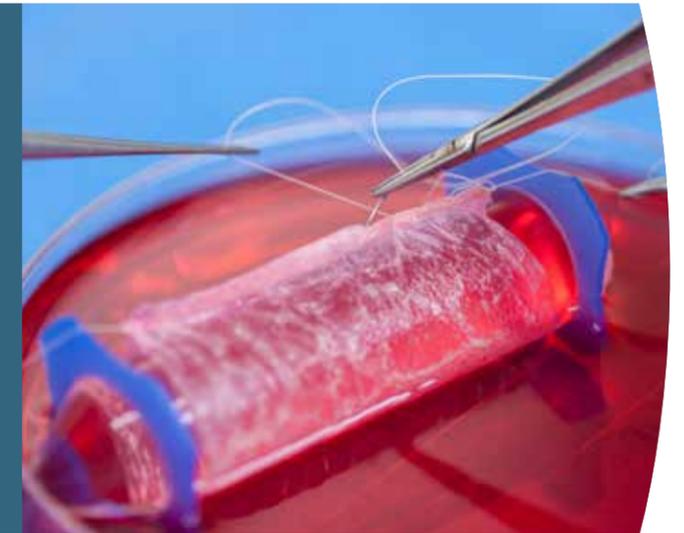
oncology team from Brenner's Children's. Pediatric cancer survivors reaching the age of 16 and deemed eligible for survivorship by the pediatric oncology team are transferred over to the Comprehensive Cancer Center for survivorship care. This location provides a new perspective for patients and families as well as a focus on transitioning from illness to health and monitoring for late effects of cancer treatment.

Survivorship care also continued across the Wake Forest Baptist Health system. The Breast Cancer Survivorship Clinic at Clemmons registered over 820 visits, addressing breast cancer-related concerns and monitoring for cancer recurrence. Nurse navigators at the Hayworth Cancer Center in High Point also continued to meet with survivors of breast, prostate, colorectal, head and neck, lung and many other cancers. More than 220 patients met virtually or in person with nurse navigators to discuss their survivorship care plans, providing a flexible way to deliver important survivorship information.

In a first this year, Survivorship Medical Director Dr. Stacy Wentworth and oncology-certified exercise physiologist Melissa Moore participated in a virtual Cancer Survivorship Week with our community partner, Cancer Services. Clinic manager Kathy Flowers, MBA, RN and other clinic staff were part of the planning committee to provide this excellent program to more than 150 patients that was both educational and fun. The second annual Cancer Survivorship Clinic provider retreat was held on Oct. 22, 2020, with a focus on self-care for our survivorship clinic providers.



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 the care of patients with genitourinary malignancies.



UROLOGIC ONCOLOGY

The Urologic Oncology Program within the Comprehensive Cancer Center brings together clinicians from multiple departments within Wake Forest Baptist Health to facilitate the provision of multidisciplinary cancer care to carry out innovative clinical trials to improve the care of patients with genitourinary malignancies.

Through the activities of the genitourinary oncology group, special expertise is directed toward the diagnosis, staging, treatment and follow-up of patients with tumors of the bladder, kidney/ureter, prostate, testis and other genitourinary sites. The latest techniques including laparoscopic and robotic approaches are offered to patients.

The genitourinary clinical trial group, established about eight years ago, consists of basic scientists and urological, medical and radiation oncologists. They oversee the success of numerous in-house, industry and cooperative oncology group trials through Alliance, the National Institutes of Health and the Radiation Therapy Oncology

Group. 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 2018, accrual to genitourinary oncology clinical trials 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 Ronald Davis, MD, MBA, Ashok Hemal, MD, Ram A. Pathak, MD, and Matvey Tsvivan, MD. The group works closely with rest of the genitourinary oncology team, including Michael McCormack, MD, Michael Goodman, MD, and Christopher Thomas, MD, from Medical Oncology, and Bart Frizzell, MD, from Radiation Oncology in addition to several team members from basic research. We are highlighting some of the research and scholarly contribution by our team.



COVID-19 & SECTION OF UROLOGIC ONCOLOGY

A recent phenomenon of medical care avoidance among patients with life-threatening illnesses, due to a fear of contracting COVID-19, was a real concern in 2020. Fear is a well-known determinant of medical care avoidance and leads to devastating clinical outcomes, due to the requirement of radical treatments and longer hospital stays. Currently, the COVID-19 pandemic is the largest threat facing health care systems worldwide. In urological fields, it is recommended that all elective surgeries be deferred in regions with a large number of COVID-19 cases. However, surgical intervention must be considered for urological cancers and urologic emergencies. There is a scarcity of papers illustrating how health care avoidance among urology patients, during the COVID-19 pandemic, has impacted their health care outcomes. Dr. Pathak highlighted the importance of obtaining access to health care in dire circumstances in his publication regarding COVID-19 and urological emergencies (CEN Case Reports 2020; 10:111-114). The uro-oncology clinic has also adopted telehealth for routine oncologic follow-up and new patients alike. Following the guidelines of our health system and our Cancer Center, we continued to serve our patients and community who had ordeal of suffering from urologic cancer.

UPPER TRACT UROTHELIAL CARCINOMA

Urothelial carcinoma of the ureter can be a potentially difficult diagnosis with a wide variety of treatments offered. Both Drs. Hemal and Pathak offer minimally invasive alternatives to the traditional open surgery. They also

have co-authored several publications and have given both national and international presentations about the subject. The procedure, as it stands today, was pioneered at Wake Forest Baptist by Dr. Hemal and has since been refined with the newer generations of the robot in their recent publication (Pathak RA, Hemal AK, Robotic Radical Nephroureterectomy for High-Risk Upper Tract Urothelial Carcinoma: Step-by-Step Illustrative Video of Surgical Technique. Urology Video Journal 2020;8).

The key to the success of robotic surgery lies in the management of the distal ureter as mentioned in their recent publication (Pathak RA, Hemal AK, Fate of Residual Ureteral Stump in Patients Undergoing Robot-Assisted Radical Nephroureterectomy for High-Risk Upper Tract Urothelial Carcinoma. TAU 2020; 9:856-862). Drs. Pathak and Hemal concluded that complete ureteral excision with bladder cuff should be performed whenever possible as this represents an integral component of the procedure.

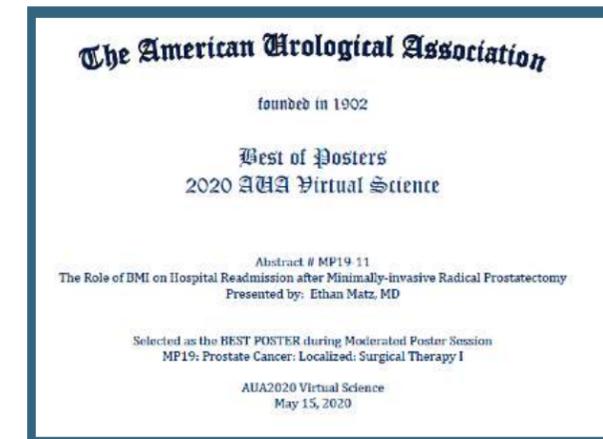
PROSTATE CANCER

Prostate cancer, from localized to metastatic, is treated by the team of urologists, radiation oncologists and dedicated genitourinary oncologists. Drs. Hemal, Pathak and Tsivian offer surgical extirpative therapy for prostate cancer.

Drs. Hemal and Pathak have pioneered a new treatment for low-risk, localized prostate cancer, robotic total prostatectomy, which involves removal of the totality of prostate tissue, sparing the seminal vesicles and vas deferens and preserving erectile function, antegrade ejaculation and urinary continence. The initial pilot series (Pathak RA, Hemal AK, Management of Low-Risk Prostate Cancer in

Patients with Enlarged Glands and Lower Urinary Tract Symptoms: Robotic Total Prostatectomy, a Novel Technique 2020; 38:829-836) reviewed 12 cases of patients who were designated as low-risk or very low-risk based on the NCCN criteria. All patients underwent robotic total prostatectomy and had negative margins post-prostatectomy. Resolution of lower urinary tract symptoms and highly efficient cancer control (PSA 0.04) were significant findings from this study. Moreover, functional parameters such as urinary continence and erectile function remained intact by six weeks postoperatively.

Drs. Pathak and Hemal have presented their data regarding robotic prostatectomy across the Centers for Disease Control's classes of obesity at the American Urologic Association's Annual Meeting (virtual). Utilizing the National Surgical Quality Improvement Database (NSQIP), Dr. Pathak found that surgeon experience is critical in managing patients with difficult anatomy. Their work earned first prize in Prostate Cancer Research. Dr. Pathak and Hemal published their findings in Investigative and Clinical Urology (2021; 62:e31).



Dr. Hemal was also senior author of a landmark study that reviewed technical innovations to optimize continence recovery and nuances of prostate dissection during robotic radical prostatectomy (Contemporary Techniques of Prostate Dissection for Robot-Assisted, Eur Urol 2020; 78:583-591). Dr. Hemal eloquently summarized available approaches for the surgical treatment of prostate cancer. Specifically, he described the different techniques that can be adopted for the surgical removal of the prostate using robotic technology.

KIDNEY CANCER

Kidney cancer has been a strong focus and initiative of the department this year. Localized kidney cancer is best managed by surgical therapy. The department offers minimally invasive options including robot-assisted partial nephrectomy by Drs. Hemal, Pathak and Tsivian. Depending on the mass size and morphology, certain treatments are preferred.

Bilateral renal cell carcinoma can be a technical challenge, especially underscoring the importance of preserving renal function. Dr. Tsivian reviewed 77 patients who underwent simultaneous partial nephrectomy. He found that performing simultaneous partial nephrectomy was technically feasible in select patients with similar outcomes as staged partial nephrectomy (Urol Oncol 2020; 38:13-22).

Dr. Hemal has published extensively this year on the surgical management of renal masses via partial nephrectomy. The purpose of partial nephrectomy, otherwise known as nephron-sparing surgery, is to save the kidney and remove the cancerous mass. Dr. Hemal and his team have examined the long-term oncologic outcomes of positive surgical margin after robotic partial nephrectomy (J Endourol 2020; 34:304-311 and TAU 2020; 9:879-886). The authors found that the rate of positive surgical margins is uncommon. However, in instances of PSM, immediate secondary intervention is likely not necessary.

Critical to performing a partial nephrectomy is the temporary cessation of blood flow to the kidney to allow for safe excision of the renal malignancy. Dr. Hemal was part of a multi-institutional publication describing the role of chronic kidney disease (stage III-V) and the benefit they receive from nephron-sparing surgery. They found that selective clamping or off-clamping in this patient population does not fare better than clamping the renal vessels (cessation of blood flow) when performing partial nephrectomy. This underscores that performing a technically sound operation is more important to overall kidney function than clamping techniques (BJU Int 2020; 125:442-448).

Dr. Davis recently reported on a patient with widespread kidney cancer metastasis that achieved a complete response from newer agent combination immunotherapies, nivolumab/ipilimumab. The patient initially presented with a large renal mass with lymphadenopathy. After four cycles of immunotherapy, the tumor became surgically resectable, and completion nephrectomy was performed (Case Rep Urol 2020; 2020:8846135).

BLADDER CANCER

Bladder cancer is the fourth most common cancer in men and fifth most common malignancy overall. In the developed world, the vast majority of bladder cancer is urothelial carcinoma. Non-muscle invasive bladder cancer (NMIBC) is of a lower stage and is treated by transurethral resection. Dr. Tsivian also found the value of a technically sound resection of bladder tumor. Performing this operation critically helps accurately diagnose and stage patients appropriately (Cent European J Urol 2020; 73:440-444).

For muscle-invasive bladder cancer, the gold-standard treatment is radical cystectomy and urinary diversion (continent or incontinent). Drs. Hemal, Pathak and Tsivian offer robotic cystectomy and totally intracorporeal diversion as a totally noninvasive manner to treat muscle-invasive bladder cancer. Apart from surgeon experience, the robotic team, which includes nurses, surgical technologists and bedside assistants, is key to performing robotic surgery, especially for patients with bladder cancer. Drs. Pathak and Hemal recently wrote an editorial regarding the rates and predictors of conversion to open surgery from laparoscopic or robotic surgery published in Translational Andrology and Urology. They found implementation of robotic technology to the management of muscle-invasive bladder cancer allows for better dissection, hemostasis and surgical proficiency (Pathak RA, Hemal AK, TAU 2019; 8:S271-273).

Lymph node dissection is critical during radical cystectomy. Dr. Tsivian offered his expertise in this realm with his recent publication *The Evolving Role of Lymphadenectomy for Bladder Cancer: Why, When and How* (TAU 2020; 9:3082-3093).

In select patients, complete bladder removal is unnecessary – rather a partial cystectomy or bladder diverticulectomy may be performed. Drs. Pathak and Hemal offer both these procedures in carefully selected patients. In their video demonstration (Videourology 2020, DOI: 10.1089/vid.2020.0040) and publications (TAU 2020; 9:2938-2945; Urology 2021; 147:311-316), partial cystectomy is considered safe with excellent long-term outcomes. The robotic approach is efficient and versatile in performing this surgery despite a diverse number of clinical presentations.

OPIOID EPIDEMIC

The opioid epidemic has dominated health care in the past several years representing the leading cause of emergency room visits in North America. From a minimally invasive surgical standpoint, the uro-oncology department has sought to transform our practice. Specifically, Drs. Pathak and Hemal have evaluated the feasibility of a completely opiate-free pain control regimen by measuring post-operative pain scores in patients undergoing robotic radical prostatectomy (RRP) via a pilot study. Data were prospectively collected from patients undergoing RRP. Prior to January 2019, patients received either tramadol or another opiate (either hydrocodone-acetaminophen or oxycodone-acetaminophen) post-operatively. After 2019, an opiate-free pathway, including scheduled Tylenol, gabapentin and ketorolac, was instituted for all patients. Furthermore, we performed a transversus abdominis plane (TAP) block utilizing liposomal bupivacaine. Pain scores were collected on both post-operative day 0 and 1. Preliminary analysis of our data suggests feasibility of this pathway with similar pain scores in the opiate and opiate-free cohorts, demonstrating the efficacy of a totally narcotic-free regimen. Drs. Pathak and Hemal reported their findings on this alarming issue in *Translational Andrology and Urology* (TAU 2020; 77:68-75).

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The Thoracic Oncology Program offers more than 25 ongoing clinical research trials, a robust second opinion program, and is a Lung Cancer Screening Center of Excellence.



THORACIC ONCOLOGY PROGRAM

The Thoracic Oncology Program is a multidisciplinary working group composed of thoracic surgery, medical oncology, interventional pulmonary medicine, interventional radiology and radiation oncology.

Lung cancer is the leading cause of cancer death in both men and women in the U.S. and the world. It is the No. 1 cancer seen, diagnosed and treated at Wake Forest Baptist Health. The program is led by L. James Wudel Jr., MD, and William Jeffery Petty, MD. Dr. Wudel is associate professor in the Department of Cardiothoracic Surgery and the director of Thoracic Surgical Oncology. He is recognized as one of the top robotic thoracic surgeons in the world. He has performed more than 1,500 robotic thoracic procedures to date, including lung resections, surgery for esophageal cancer and surgery for mediastinal tumors. Dr. Petty is professor in the Department of Hematology and Oncology and associate professor in the Department of Cancer Biology. He is considered a national expert on lung cancer, has been recognized for his many contributions to the field of lung cancer research and is one of U.S. News & World Report's "Best Doctors." William Blackstock, MD, is a renowned radiation oncologist, chair of our Radiation Oncology department and supports the program's efforts.

The Thoracic Oncology Program is coordinated by Lisa Flowers, RN, and its working group holds weekly meetings that are staffed by representatives from the following departments:

- » Cardiothoracic Surgery: L. James Wudel Jr., MD
- » Radiation Oncology: William Blackstock, MD, and Michael Farris, MD
- » Medical Oncology: William Petty, MD, Tom Lycan, MD, Jimmy Ruiz, MD, and Stefan Grant, MD
- » Interventional Pulmonary Medicine: Christina Bellinger, MD, Karl Thomas, MD, Travis Dotson, MD
- » Interventional Radiology: Trevor Downing, MD

The Thoracic Oncology Program uses state-of-the-art techniques and technology to diagnose and treat lung cancer, including groundbreaking precision medicine and personalized genomic medicine. The working group opened 14 trials in 2020, with studies and initiatives ranging from screening to experimental therapies for advanced and recurrent disease. In 2020, 155 patients were entered into lung cancer-specific clinical trials.

The Thoracic Oncology Program offers more than 25 ongoing clinical research trials and a robust second opinion program, and is a Lung Cancer Screening Center of Excellence.

COMPREHENSIVE CANCER CENTER

2020 cancer data



2019 CANCER REGISTRY DATABASE

TOTAL CASES*	NUMBER	PERCENT
Lung	662	13.5
Breast	463	9.4
Prostate	422	8.6
Oral cavity, pharynx	310	6.3
Colorectal	306	6.2
Brain, CNS	288	5.9
Melanoma of skin	256	5.2
Leukemia	198	4
Kidney, renal pelvis	196	4
Pancreas	175	3.6
NH Lymphoma	171	3.5
Bladder	150	3.1
Uterus	131	2.7
Thyroid	108	2.2
Multiple myeloma	86	1.8
Larynx	83	1.7
Other endocrine	75	1.5
Stomach	74	1.5
Liver, intrahepatic bile duct	73	1.5
Ovary	72	1.5
Unknown primary	72	1.5
Esophagus	59	1.2
Connective tissue	54	1.1
Other female	47	1
Mets SCCa/BCCa, skin	37	0.8
Anus, anal canal	36	0.7
CMPD, MDS	33	0.7
Gallbladder, biliary	32	0.7
Small intestine	31	0.6
Cervix, invasive	23	0.5
Eye	22	0.4
Bone	22	0.4
Retropitomeum	19	0.4
Hodgkins disease	18	0.4
Ill-defined	17	0.3
Nasal, sinus	16	0.3
Other urinary	15	0.3
Other skin	14	0.3
Testis	10	0.2
Other male	9	0.2
Pleura, mediastinum, heart	8	0.2
Thymus	5	0.1
Other hematopoietic	5	0.1
Other digestive	4	0.08
Peripheral nerves	4	0.08
Other respiratory	1	0.02
Total Cases	4,912	100

GENDER	NUMBER	PERCENT
Male	2,671	54.4
Female	2,241	45.6

RACE	NUMBER	PERCENT
White	4,152	84.5
Black	680	13.8
Other	80	1.6

ETHNICITY-HISPANIC	NUMBER	PERCENT
Male	56	1.1
Female	58	1.2

CLASS OF CASE	NUMBER	PERCENT
Analytic/new dx	4,206	85.6
Non-analytic/recurr	532	10.8
Dx workup	174	3.5

RESIDENCE	NUMBER	PERCENT
North Carolina	4,295	87.4
Other States in USA	612	12.5
Outside of USA	5	0.1

PATIENT HISTORY	NUMBER	PERCENT
Family History	3,144	64
Tobacco History	2,938	59.8
cigarette	761	
cigar/pipe	22	
snuff/chew/smokeless	111	
combination use	27	
previous use	2,017	
Alcohol History (2 or more drinks/day)	824	16.8
current use	641	
past history	183	

PRIMARY NEOPLASMS	NUMBER	PERCENT
One primary only	3,365	68.5
First of two primaries	192	3.9
Second primary	834	17
Third primary	178	3.6
Fourth primary	35	0.7
Fifth primary	12	0.2
Sixth primary	3	0.06
Eighth primary	1	0.02
Benign neoplasms	292	5.9

*Includes malignant, in-situ, selected benign cases, newly diagnosed, recurrent and diagnostic workup cases

COMPARISON OF 2019 WFBMC, STATE AND NATIONAL DATA

PRIMARY SITE	WFBMC		NORTH CAROLINA		USA	
	CASES	PERCENT	CASES	PERCENT	CASES	PERCENT
Lung	572	15.3	9,251	15.3	228,150	12.9
Breast	356	9.5	9,044	15	271,270	15.4
Prostate	321	8.6	7,438	12.3	174,650	9.9
Oral cavity, pharynx	270	7.2	1,653	2.7	53,000	3
Colorectal	243	6.5	4,752	7.9	145,600	8.3
Leukemia	183	4.9	1,656	2.7	61,780	3.5
Kidney, renal pelvis	173	4.6	2,188	3.6	73,820	4.2
Pancreas	161	4.3	1,691	2.8	56,770	3.2
Melanoma of skin	160	4.3	3,207	5.3	96,480	5.5
NH Lymphoma	146	3.9	2,187	3.6	74,200	4.2
Bladder (includes in-situ)	125	3.4	2,639	4.4	80,470	4.6
Uterus	123	3.3	1,778	2.9	61,880	3.5
Thyroid	91	2.4	1,421	2.4	52,070	3
Multiple myeloma	68	1.8	1,004	1.7	32,110	1.8
Liver, intrahepatic bile duct	66	1.8	1,131	1.9	42,030	2.4
Larynx	66	1.8	531	0.9	12,410	0.7
Brain, CNS	62	1.7	768	1.3	23,820	1.4
Stomach	59	1.6	831	1.4	27,510	1.6
Ovary	53	1.4	731	1.2	22,530	1.3
Connective Tissue	50	1.3	388	0.6	12,750	0.7
Esophagus	42	1.1	573	1	17,650	1
Small intestine	29	0.8	387	0.6	10,590	0.6
All other sites	313	8.4	5,222	8.6	130,910	7.4
Total Cases	3,732	100	60,471	100	1,762,450	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 2019

USA—estimated numbers from American Cancer Society Cancer Facts and Figures 2019



PRIMARY SITE DISTRIBUTION 2019

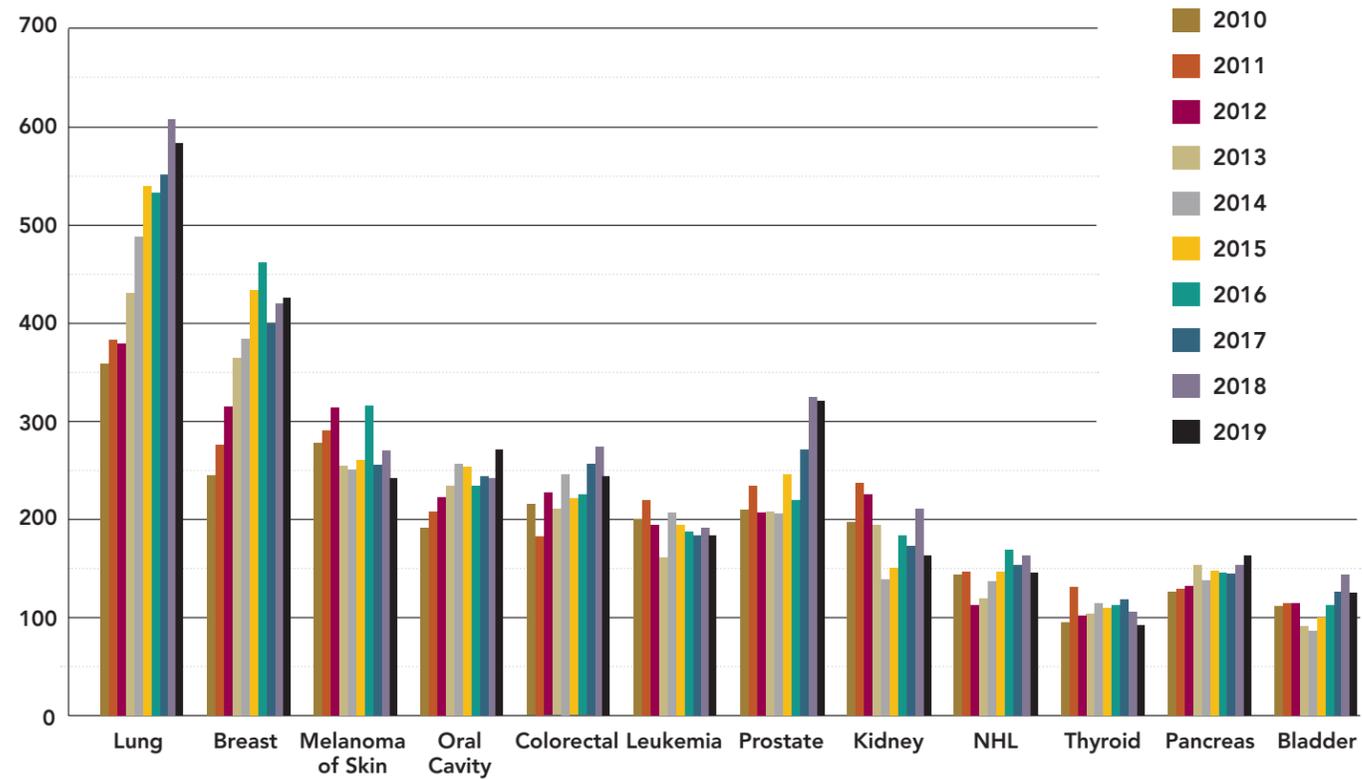
Site	Total	Class of Case*			Gender, Race and Ethnicity							
		A	NA	C	white		black		other		hispanic	
					male	female	male	female	male	female	male	female
Total Cases	4912	4206	532	174	2236	1802	345	335	34	46	56	58
Oral cavity, pharynx	310	272	29	9	199	83	12	7	5	2	1	1
lip	12	10	2	0	6	6	0	0	0	0	0	0
tongue	96	87	8	1	67	24	2	1	0	1	0	1
gum	17	17	0	0	8	8	1	0	0	0	0	0
floor of mouth	12	10	1	1	6	6	0	0	0	0	0	0
palate	13	13	0	0	6	4	1	1	0	1	0	0
other mouth	36	29	5	2	21	10	2	2	1	0	0	0
salivary	29	25	3	1	18	8	1	2	0	0	0	0
tonsil	56	47	6	3	44	10	1	0	1	0	0	0
oropharynx	12	11	1	0	10	1	1	0	0	0	0	0
nasopharynx	11	9	2	0	1	3	3	0	3	0	1	0
pyriform sinus	2	2	0	0	2	0	0	0	0	0	0	0
hypopharynx	8	7	1	0	7	1	0	0	0	0	0	0
other oral cavity	6	5	0	1	3	2	0	1	0	0	0	0
Digestive system	790	661	69	60	377	262	66	56	4	7	9	9
esophagus	59	45	3	11	49	4	3	1	0	0	2	0
stomach	74	60	2	12	38	21	5	7	0	1	1	1
small intestine	31	29	2	0	12	12	5	1	0	0	0	1
colon	203	154	41	8	83	82	14	17	2	1	0	4
rectosigmoid	13	12	0	1	8	5	0	0	0	0	0	0
rectum	90	77	12	1	47	25	7	7	1	1	1	1
anus/anal canal	36	21	1	14	13	15	2	4	0	1	0	1
liver	73	67	4	2	39	16	11	1	1	2	3	0
gallbladder	8	7	1	0	2	3	1	2	0	0	0	0
biliary	24	22	1	1	14	5	2	1	0	0	1	1
pancreas	175	163	2	10	71	71	16	15	0	1	1	0
other digestive	4	4	0	0	1	3	0	0	0	0	0	0
Respiratory system	767	668	71	28	381	269	62	38	5	5	6	1
nasal cavity	8	6	2	0	6	1	0	0	0	0	1	0
sinuses	8	8	0	0	6	2	0	0	0	0	0	0
larynx	83	70	11	2	51	18	9	5	0	0	0	0
lung-non small cell	578	504	52	22	276	211	48	29	5	4	4	1
lung-small cell	84	74	6	4	40	36	4	4	0	0	0	0
thymus	5	5	0	0	2	0	1	0	0	1	1	0
other respiratory	1	1	0	0	0	1	0	0	0	0	0	0
Pleura, mediastinum, heart	8	8	0	0	5	2	1	0	0	0	0	0
Bone	22	21	0	1	5	9	2	1	0	1	2	2
Hematopoietic system	322	277	39	6	165	83	28	25	1	3	9	8
multiple myeloma	86	68	13	5	36	23	17	10	0	0	0	0
lymphoid leukemia	52	46	6	0	27	11	1	3	0	1	5	4
myeloid leukemia	136	128	8	0	71	42	8	8	1	2	2	2
other/leukemia	10	9	0	1	6	3	0	1	0	0	0	0
CMPD,MDS	33	22	11	0	20	4	2	3	0	0	2	2
other	5	4	1	0	5	0	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	307	254	31	22	210	95	1	0	1	0	0	0
melanoma	256	241	15	0	170	85	0	0	1	0	0	0
other skin	14	13	1	0	11	2	1	0	0	0	0	0
metS SCCa/BCCa	37	0	15	22	29	8	0	0	0	0	0	0
Peripheral nerves	4	3	1	0	1	1	0	1	0	1	0	0
Retroperitoneum	19	16	3	0	6	8	1	4	0	0	0	0
Connective tissue	54	50	4	0	27	16	3	3	0	0	4	1
Breast	463	425	34	4	2	355	2	89	0	8	0	7
Female genital system	273	229	20	24	0	223	0	35	0	5	0	10
vulva	32	21	0	11	0	28	0	4	0	0	0	0
vagina	7	2	2	3	0	6	0	0	0	0	0	1
cervix, invasive	23	21	1	1	0	17	0	4	0	0	0	2
uterus	131	123	8	0	0	107	0	18	0	2	0	4
ovary, malignant	60	53	7	0	0	50	0	6	0	3	0	1
ovary, borderline	12	2	1	9	0	8	0	2	0	0	0	2
other female	8	7	1	0	0	7	0	1	0	0	0	0
Male genital system	441	336	105	0	331	0	92	0	8	0	10	0
penis	8	7	1	0	8	0	0	0	0	0	0	0
prostate	422	321	101	0	315	0	92	0	8	0	7	0
testis	10	7	3	0	7	0	0	0	0	0	3	0
other male	1	1	0	0	1	0	0	0	0	0	0	0
Urinary system	361	318	38	5	223	82	30	14	3	1	5	3
kidney	183	165	17	1	98	44	23	7	3	1	4	3
renal pelvis	13	13	0	0	4	8	1	0	0	0	0	0
ureter	11	11	0	0	7	4	0	0	0	0	0	0
bladder	150	125	21	4	111	25	6	7	0	0	1	0
other urinary	4	4	0	0	3	1	0	0	0	0	0	0
Eye	22	21	0	1	13	7	0	2	0	0	0	0
Brain, CNS	288	250	33	5	97	140	10	28	2	4	1	6
brain, CNS malignant	73	62	9	2	32	33	3	3	1	0	1	0
brain, CNS benign	215	188	24	3	65	107	7	25	1	4	0	6
Thyroid/Endocrine	183	152	27	4	65	75	14	11	2	7	1	8
thyroid	108	93	13	2	31	58	6	3	1	4	0	5
adrenal	7	5	1	1	3	2	1	1	0	0	0	0
other, malignant	3	3	0	0	2	0	0	1	0	0	0	0
other, benign	65	51	13	1	29	15	7	6	1	3	1	3
Lymphoma	189	161	25	3	93	58	12	12	3	2	7	2
NH Lymphoma	171	146	22	3	86	54	10	9	3	2	6	1
Hodgkins disease	18	15	3	0	7	4	2	3	0	0	1	1
Unknown Primary	72	69	1	2	24	31	7	9	0	0	1	0
Ill-defined	17	15	2	0	12	3	2	0	0	0	0	0

*Class of Case: A=analytic, newly diagnosed; NA=non-analytic, first seen with recurrent disease; C=diagnostic workup and Reportable by Agreement per Cancer Committee and sq 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.

COMPARISON OF WFBMC MOST PREVALENT SITES BY YEAR newly diagnosed cases



2020
published
abstracts

PUBLISHED ABSTRACTS:

CGM = Cancer Genetics and Metabolism Program

CPC = Cancer Prevention and Control Program

NRO = Neuro-Oncology Program

SBT = Signaling and Biotechnology Program

- Ali YM, Sweeney J, Shen P (SBT), Votanopoulos KI (SBT), McQuellon R (CPC), Duckworth K (CPC), Perry KC, Russell G, Levine EA (CGM). Effect of Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy on Quality of Life in Patients with Peritoneal Mesothelioma. *Annals of Surgical Oncology*. 2020 Jan; 27(1): 117-123. doi: 10.1245/s10434-019-07425-5. PMID: 31069554. PMC6842037.
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