The Center of Cancer Care in West Virginia

2015 CAMC Cancer Services Report
Inside the 2015 CAMC Cancer Services Report

CAMC cancer services have been accredited since 1956 and offer the most, highest trained, nationally certified health care professionals in the region.

In 2015 many exciting things happened to improve cancer care for West Virginia. In May the CAMC Cancer Center opened its doors to patients. This paved the way to consolidate many services under one giant roof. Hematology/Oncology services, the CAMC Breast Center and CAMC Radiation Oncology Services are now in one location.

Each service that has moved into the cancer center is now providing diagnostic and treatments with the latest equipment and procedures.

The Breast Center has new 3-D mammography (known as digital tomosynthesis). CAMC Radiation Oncology Services offers several types of radiation therapy designed to treat all forms and stages of cancer and some noncancerous conditions including stereotactic radiosurgery and body radiation therapy (SRS/SBRT), intensity modulated radiation therapy (IMRT), external beam radiation therapy (EBRT) and mammosite Brachytherapy (Accelerated Partial Breast Treatment).

Many patient and family support services also opened in the new cancer center including a pharmacy, resource center and boutique.

Healing art, specially created by artists tied to West Virginia and/or cancer, hangs on the walls and in the healing garden near the main entrance.

Also in 2015 The Commission on Cancer recognized CAMC with its Outstanding Achievement Award. This award is given to cancer centers that meet every standard plus accomplish the commendation level of performance for all seven possible commendations. In order to be awarded, the facility had to have perfect scoring for all three years of the survey period. CAMC was the only hospital in West Virginia to achieve this award in 2014.

Throughout this annual report there are graphs of data collected by CAMC’s cancer registry demonstrating how CAMC compares to other CoC accredited facilities. CAMC has the highest volume for cancer care in West Virginia. CAMC’s follow-up rate of all patients in the registry is currently 90.61%, well above the CoC’s required standard of 80%. Likewise, CAMC’s follow-up rate for patients diagnosed within the past five years is at 91.05%, above the required 90% rate.

A unique feature of the surgeons at CAMC is the collaborative effort put forth to ensure that the best care is provided for each patient. CAMC’s cancer conference (tumor board) is a well-established and consistently well-attended weekly meeting. Core members and case presenters include multiple practitioners from many specialties and support disciplines.
CAMC Cancer Center
By Sarah Huff, RN, BSN, OCN, Clinical Management Coordinator

The Charleston Area Medical Center Cancer Center (CAMC Cancer Center) is CAMC’s center for adult medical oncology and hematology care. A DNV (Det Norske Veritas) accredited facility, the CAMC Cancer Center provides personalized multidisciplinary cancer care, access to innovative clinical cancer research trials and hematological care for a diversity of benign and malignant conditions in a caring environment.

After many years of planning, fundraising and construction, the vision of building a new cancer became a reality. On May 4, 2015, CAMC opened the doors to a brand new, 110,000 square foot, state-of-the art cancer center. CAMC Radiation Oncology Services, CAMC Cancer Center as well as the CAMC Breast Center are now housed under one roof. The new building also hosts an outpatient pharmacy, gift shop/boutique, outpatient lab (Labworks,) and a small coffee/snack shop (Outtakes.)

The Cancer Center’s infusion center treats on the average of 60 patients daily while eight hematology/oncologists have full clinic schedules Monday through Friday from 8 a.m. to 4:30 p.m.

To address the growing access-to-care needs of our community, we have incorporated a physician assistant in our daily outpatient clinic. Dr. Terrance Rhodes continues to provide educational programs to expand the knowledge of our physician extenders in an ever changing oncology realm. The Cancer Center currently has four physician assistants and two nurse practitioners, who complement our physician team. This has proven an enhancement to both our inpatient and outpatient care.
The CAMC Cancer Center Teays Valley office, staffed by Dr. Robert Oldham, opened in March 2014 and is fully operational to meet the needs of our patients in the Teays Valley and surrounding area. This office offers the services of hematology and oncology specialty, with privileges at CAMC Teays Valley Hospital, and a complete chemo infusion area.

The majority of the Cancer Center’s nurses are certified in oncology and the cancer center was honored to receive a plaque from the oncology nursing certification corporation for promoting certification and maintaining the majority of certified nurses. The Cancer Center is also privileged to have two board certified oncology pharmacists on staff along with a third pharmacist who assists with the increased volumes of Teays Valley.

The Cancer Center also hosts a resource room which is located on the first floor of the cancer center close to the information desk. The resource room houses our CARE (Comprehensive Assistance to Resources and Education) Team, which consists of three patient navigators, two financial navigators, a social worker, a dietitian, a psychologist (Dr. Jennifer Hancock,) as well as the QOPI coordinator. The resource room also offers a room (Gigi’s Place) where a child psychologist can meet with children who may have a parent, grandparent, or loved one who has been diagnosed with cancer. Patients and their families can also browse through printed materials available in the resource room. The Cancer Center encourages all patients and their family members to stop in at any time during normal business hours. No appointment necessary.

Patient navigation remains a focus of the Cancer Center. Currently there is a dedicated navigator for colorectal cancer patients and lung cancer patients, along with two navigators for breast cancer patients (one located at the Cancer Center and the other located at the Breast Center.) The navigator follows the patients from diagnosis through treatment and recovery and is there to assist with any barriers or concerns experienced during the cancer care continuum.

The Cancer Center has two dedicated financial navigators, a social worker and new patient coordinator for the oncology population. The financial navigator assists patients in obtaining health care coverage, indigent medication assistance, and access to local and national organizations that provides support to cancer patients. The social worker assists patients with transportation/housing issues, mental health assistance, living will/MPOA, referrals for home health, durable medical equipment, etc. The social worker can also assist with completion of medial forms (i.e., health insurance, FMLA, short term disability and long term disability.) The new patient coordinator is a dedicated scheduler that provides a contact for patients and referring physicians.

The CAMC Cancer Center also has a Survivorship program. This program provides patients, who have completed treatment with a curative intent, with their plan of care. The plan of care is an explanation of what the patient’s follow-up schedule will look like over the next several months to years. A copy of the patient plan is also sent to the patient’s primary care physician in order to keep the PCP up-to-date.
on the patient’s cancer care history, as well as the patient’s future needs. The CAMC Cancer Center is excited to offer this resource to patients.

The PET Therapy program at the CAMC Cancer Center continues to thrive and is thoroughly appreciated by staff and patients. Inspired by the innovative patient-centered care initiated by our pediatric hematology oncology colleagues and supported by the adult oncology collaborative practice committee, this program has been warmly embraced by our CAMC Cancer Center patients and families. Several certified pet therapy dogs have been a “big hit” and we look forward to expanding this unique initiative for our patients undergoing active chemotherapy treatments.

The Cancer Center physician team has continued its’ participation in numerous quality improvement, medical staff, graduate medical education and clinical cancer research activities. Our physicians actively participate in the weekly multidisciplinary CAMC tumor board conference led by Dr. Steven Jubelirer which facilitates peer-reviewed input in the initial and/or ongoing management of individual patients. Patients presented at this conference also contribute to the Breast Cancer Center of Excellence program led by Dr. Roberto Kusminsky. There has also been a monthly gastrointestinal tumor board that has been well attended by multiple disciplines. In addition, the Cancer Center physician representation at the monthly meetings of the oncology collaborative practice committee and CAMC cancer committee provide essential physician leadership in the support of inpatient-outpatient adult cancer care initiatives and medical center wide activities necessary for ongoing Accreditation by the American College of Surgeons Commission on Cancer. This year the Cancer Center received certification with commendation. CAMC Cancer Center physician leaders continue to play an important role in the CAMC Physician Group, department of medicine activities as well as medicine quality improvement committee, performance improvement committee and presentations to the CAMC board on quality on topical issues. The Cancer Center physicians and staff have achieved certification by the American Society of Clinical Oncology’s Quality Oncology Practice Initiative (QOPI), a volunteer initiative of self-assessment in the quality delivery of cancer care with participating oncology practices throughout the United States. The CAMC Cancer Center currently holds the honor of being the first and only cancer center in the state to receive the QOPI accreditation by ASCO.

Nurses at the Cancer Center continue to participate with the state Oncology Nursing Society chapter.

In addition to patient care and quality improvement activities, Cancer Center physicians participate in the education of internal medicine residents of the WVU School of Medicine Charleston-Division. Our physicians with volunteer faculty appointments provide clinical training in adult hematology oncology for the newly created four-week block rotations as well as providing year-round formal academic lectures on topics in hematology oncology. Trainees also have the opportunity to work with Cancer Center staff physicians on research projects leading to academic presentations/publications integral to their training requirements.
CAMC’s Clinical Cancer Research activities have been central to providing state-of-the-art cancer care opportunities for our patients for more than 25 years. Later in this report, Dr. Dan Lucas summarizes our cancer center’s contributions to this ongoing effort over the past year. At the CAMC Cancer Center, Dr. Jubelirer has been the physician champion for this research effort in partnership with the CAMC Health Education and Research Institute (CHERI) and fellow Cancer Center physicians. Dr. Jubelirer has expanded physician mentorship and co-leadership for these activities to include Dr. Ahmed Khalid for National Surgical Adjuvant Breast and Bowel Project (NSABP) Clinical Trials and Dr. Arun Nagarajan for Eastern Cooperative Oncology Group (ECOG) Clinical Trials. Each Cancer Center physician entering patients into clinical cancer research trials is approved by the CAMC Investigational Review Board and National Cancer Institute. Under the auspices of the West Virginia Oncology Society, CAMC Cancer Center physicians and CHERI leadership, in joint collaboration with other cancer clinical trial sites and cancer care practice sites in WV, continue to address expanding clinical trial access to West Virginians.

Publications of physicians of the David Lee Cancer Center:

*Title:*  
A prospective study of patterns of chemotherapy (chemo), G-CSF use and burden of G-CSF injections in early-stage breast cancer (ESBC)

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**Topic:** Patient and Survivor Care- Symptom Management/Supportive Care

Background: Febrile neutropenia (FN) is a common side effect of myelosuppressive chemo. Primary prophylaxis (PP) with G-CSFs can reduce FN incidence and is recommended when a patient (pt) has a high risk of FN (> 20%). We describe current patterns of chemo use and burden of G-CSF injections for ESBC pts in US clinical practice.

Methods: This was a prospective cohort study of adult ESBC pts receiving their 1st chemo course who had high FN risk based on high- or intermediate-risk chemo regimen with individual risk factors. The burden associated with G-CSF injections was assessed via questionnaires among pts who received G-CSF. Interim results for the 1st chemo cycle are reported.

**Results:** As of 15 Aug 2014, 315 of 800 planned pts had completed the 1st chemo cycle. Most were < 65 yrs old (74.0%), had a BMI < 30 (54.9%), and had few comorbidities. See table for additional characteristics and comorbidities. The most common regimens received were ddAC-T (30.2%), TC (25.1%), and TCH (17.8%). 90.2% received PP with G-CSF: 94.7% of these received pegfilgrastim, and 5.3% received filgrastim. Mean (SD) one-way travel time for a G-CSF injection was 32.5 (26.8) minutes; time in office was 38.8 (64.2) minutes. In the 1st chemo cycle, mean (SD) time missed from work for G-CSF administration was 2.6 (8.4) hrs and from non-work activities was 7.1 (17.1) hrs. 62.2% had someone else drive them to receive G-CSF; 59.8% received assistance from a non-paid caregiver. 23.0% were bothered by travel for G-CSF. 14.9% considered G-CSF injections moderately or very inconvenient.

<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>N = 315</th>
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<tr>
<td>Age, mean (SD) yrs</td>
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<tr>
<td>BMI, mean (SD)</td>
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<tr>
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<tr>
<td>Depression</td>
<td>13.3%</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>11.7%</td>
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</table>
Conclusions: Dose-dense and taxane-based regimens are common. As many high-risk pts with ESBC receive PP with G-CSF; travel and time needed to receive G-CSF can contribute to pt burden.

ER: estrogen receptor. PR: progesterone receptor.

American Society of Hematology: Abstract #81401
A 10 Year Retrospective Analysis of Carotid, Coronary and Lower Limb Arterial Stenosis in Patients with Polycythemia Vera or Essential Thrombocythemia

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Background: Patients with polycythemia vera (PV) or essential thrombocythemia (ET) are at an increased risk for thrombotic events. The pathophysiology of hyperviscosity, leukocyte-induced endothelial damage and the over-expression of JAK2 and STAT5 genes contributing to the development of atherothrombosis is poorly understood. As such, the goal of our study was to retrospectively examine carotid, coronary and lower limb stenosis severity in patients with PV or ET and to determine if stenosis associated with thrombotic events.

Patients and methods: We examined adult patients in a 10-year period (2004-2014) who were under the care of a hematologist at our tertiary care-teaching hospital for either PV ET, and, had one or more of the following: carotid duplex, cardiac catheterization or ankle-brachial index (ABI). Patients having diagnoses of secondary polycythemia or secondary thrombocytosis were excluded. Data obtained from patient charts included demographics, cardiovascular risk factors, thrombotic events, platelet and hematocrit levels, medications and arterial stenosis. Clinically significant carotid stenosis was defined as >50% stenosis of the internal carotid artery, coronary stenosis as >50% in 1 or more coronary arteries and lower limb stenosis as an ABI <0.9. We compared patients with stenosis to those without stenosis using Fisher exact tests.
Results: Carotid stenosis: Of the 39 patients meeting study inclusion and receiving carotid imaging, 15 (38%) presented with clinically significant carotid stenosis with 4 (10%) patients having increasing carotid stenosis severity during the study period. Elevated platelet counts >400,000 correlated with carotid stenosis in 9 patients (23%) and Hct >45% with stenosis in 5 patients(13%). Out of the 15 patients who had stenosis, 11 were on anticoagulation/antiplatelet medication and 9 were on cytoreduction therapy at time of stenosis diagnosis. A total of 15 patients had 1 or more thrombotic events during the 10 year period. Stroke/TIA after duplex occurred in 13% of patients with carotid stenosis versus 17% of patients with no stenosis (P = 1.00). Three patients received carotid revascularization. Carotid endarterectomy appeared to be successful in 2 patients who presented with severe internal carotid artery stenosis. The other patient who received angioplasty for fibromuscular dysplasia and found to have carotid stenosis of <30% stenosis, later required neurological consults months post procedure due to TIA-like symptoms. Thus, in this patient’s case, the underlying cause of the recurring symptoms may have been related to ET.

Lower limb stenosis: A total of 9 patients met inclusion criteria and received ABIs, of which 6 (66%) had lower extremity stenosis. Out of the 5 patients with stenosis and accompanying lab values, one patient had elevated platelets (20%). Three patients with stenosis underwent revascularization with no thrombotic events occurring post-intervention.

Coronary stenosis: We reviewed 31 patients who met the criteria of ET/PV diagnosis and underwent cardiac catheterizations, of which 22 patients (71%) had significant coronary stenosis. The number of patients with stenosis and elevated platelets was 6 (19%) and those with Hct >45% was 9 (29%). All patients with stenosis received anticoagulation/antiplatelet medications and 68% were on cytoreduction therapy. Thrombotic events occurred after cardiac catheterizations in 7 patients (23%) with cardiac specific events (MI and unstable angina) occurring in 14% of patients with coronary stenosis versus 11% of patients with no stenosis (P = 1.00). A total of 14 patients received coronary revascularization (9 having percutaneous coronary intervention (PCI), 4 having coronary artery bypass grafting (CABG), 1 had CABG and PCI.) One patient had unstable angina 12 months after PCI and one had a MI 3 years after PCI.

Conclusion: This study suggests that carotid stenosis, lower limb stenosis and significant coronary stenosis are common in patients with ET or PV under vascular surveillance; however incidence of thrombotic events was similar between patients with and without diagnosed stenosis. Furthermore, patients with suspected carotid, coronary or lower limb stenosis, and/or presenting with stroke or other vascular event, in the presence of sustained elevated platelet/hematocrit levels may need to be evaluated for an underlying hematological disorder.
Secondary Malignancies in Mantle Cell Lymphoma

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Background: Mantle cell lymphoma is a B cell lymphoma (CD5 +) which represents 5-10 % of Non-Hodgkin’s lymphoma. Most patients have advanced disease at presentation and thus carry a poor prognosis. This type of uncommon malignant lymphoma has a distinct and recurring cytogenetic abnormality involving t(11, 14) q(13, 32). Although extra nodal involvement is common, not many cases of MCL having concomitant other malignancies are reported. We hypothesized that patients with MCL have chronic immunosuppression, comparable to chronic lymphocytic leukemia patients, and therefore are at risk for developing secondary malignancies similar to CLL patients. The aim of our study is to report the retrospective analysis of patients diagnosed with MCL and the associated secondary malignancies before or after the diagnosis of MCL.

Patients and methods: The records of 41 patients who presented with MCL to “The David Lee Cancer Center” at CAMC, WVU with MCL from 2000 – 2015 were retrospectively reviewed. The number of other malignancies presenting before or after the diagnosis of MCL were analyzed.

Results: The population with MCL was represented by 41, all Caucasian patients, which were 75.6% male (n = 31) and had an average age of 68.6 ± 11.3 years. Mean follow up for all patients was 23.9 ± 32.43 months. A total of 14.6% (n=6), 83.3% males, experienced a second primary. Within the second primaries 50.0% were GI cancers which included pancreatic cancer and cholangiocarcinoma while 16.7% were prostate cancer, diffuse large B-cell lymphoma or adenocarcinoma of lungs. The time to second primaries varied with 50% of the cases being diagnosed simultaneously with MCL, while 33.3% were diagnosed prior to MCL at an average time of 34.5 months, and 16.7% were diagnosed post MCL diagnosis at an average time of 18 months.

Conclusion: Patients with MCL are typically CD5 positive, CD10 negative, and CD23 negative which make it different from other lymphomas like small cell lymphoma, B-cell CLL that are CD 23 positive. Rare cases of MCL may be CD5 negative or CD23 Positive. We hypothesized that MCL patients have an increased risk for developing secondary cancers due to their disease biology and from underlying chronic immunosuppression. Patients with MCL have twice the risk of developing secondary malignancies and an increased frequency of certain types of cancers such as cholangiocarcinoma and pancreatic cancer.
Clinical presentation and treatment responses in IgM-related AL amyloidosis

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Abstract: Amyloid light-chain (AL) amyloidosis is a multi-organ disease due to deposition of misfolded monoclonal immunoglobulin light chains. IgM AL amyloidosis is a rare variant, about 6% of AL amyloidosis cases, and more data are needed for treatment guidance. In IgM AL amyloidosis, the clonal cell of origin may be a plasma or lymphoplasmacytic cell, and treatments targeting each are employed. We describe presenting clinical and laboratory features of 95 patients with IgM AL amyloidosis treated at Boston University Amyloidosis Center from 1996 to 2012.

The median diagnosis age was 66 years (range: 38–89) with 56% males. Organ involvement rates were: kidney (51%); heart (40%); lymph nodes (25%) and gastrointestinal tract (17%). Treatment responses were analyzed for 46 patients seen after 2003. Five treatment regimens were assigned by bone marrow pathology and patient-specific factors. Overall hematologic response rates and very good partial or complete hematologic response rates, respectively, were: high-dose melphalan/stem cell transplant (HDM/SCT) 100%;80%, Bortezomib 82%;27%, Rituximab 80%;27%, immunomodulatory agents (IMids) 75%;0%, and standard dose alkylating agents (Melphalan or cyclophosphamide) 63%;19%. Overall, 5-year survival rates were significantly higher in patients with a hematological response: 79.2 ± 8.5% versus 41 ± 14.9% in non-responders, which is more favorable than typically expected in AL amyloidosis.

Materials and methods: A retrospective study of prospectively collected data was conducted on patients diagnosed with IgM-related AL amyloidosis and evaluated at Amyloidosis Center at Boston Medical Center in Boston, Massachusetts from 1996 to 2012.

All clinical data were collected with the approval of the BMC Institutional Review Board. Altogether, clinical and laboratory characteristics for 95 cases of IgM AL amyloidosis were analyzed. A subset of 46 patients treated between 2003 and 2012 with adequate demographic, hematologic, pathologic, organ involvement, treatment and follow-up data were included in a separate analysis. For this subset, the median follow-up time was 50 months (range 16.8–80.4 months) and cases were included in the
treatment results analysis only if there were 2 or more months of follow-up after initial therapy.

Cases with biopsy-proven AL amyloidosis with an associated monoclonal IgM paraproteinemia on serum immunoelectrophoresis were classified as having IgM AL amyloidosis. All treated cases had clinical evidence of functional organ impairment. The presence of amyloid was confirmed by the characteristic Congo red staining of bone marrow, fat pad aspirates or tissue biopsies. Bone marrow workup included staining with hematoxylin and eosin and Congo red, immunohistochemistry for CD138 and in-situ hybridization for kappa and lambda light chain mRNA.

Immunohistochemical staining for B cell antigens and flow cytometry to identify clonal B cell populations was performed in selected cases. Serum immunoglobin FLCs were measured using the Freelite_ assay (The Binding Site, Birmingham, UK). Hematological response was defined as the best recorded response with the following analytic groupings: complete response (CR), very good partial response (VGPR), partial response (PR) and no response (NR) according to the 2010 ISA consensus criteria [7].

In addition, overall response (OR) was analyzed, defined as any level of positive response. Treatment regimens were categorized into five analytic groups: high-dose melphalan combined with autologous stem cell transplant (HDM/SCT); bortezomib; rituximab; immunomodulating drugs (IMiDs); and non-transplant alkylating agents (melphalan, cyclophosphamide) given without novel agents or rituximab. Sample size for the group of all other drugs was too small for analysis. These treatment groups were not mutually exclusive, and results are presented for all drugs received by patients. Some patients may have received more than one treatment as different lines of therapy.

Treatment decisions were made by a multi-disciplinary team of amyloid physicians taking into account patient performance status, organ function, patient co-morbidities, accessibility to care, available clinical trials guidance and pathologic features.

All patients undergoing transplant received follow-up evaluations at 6 months and 1 year and bone marrow biopsies were obtained at those times. A complete history and physical exam, comprehensive blood counts and metabolic panels as well as serum FLCs, serum protein electrophoresis and serum/urine immunofixation electrophoresis were done at baseline and at each follow-up visit to assess disease status.

Follow-up for patients receiving non-transplant therapy was more variable.

**Statistical analysis:** Due to the relatively small group sample sizes (95 cases in the overall series; 46 cases in the recently treated subgroup), nonparametric statistics were used to analyze the data. Analysis
was performed using SPSS (IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0, Armonk, NY: IBM Corp) or using STATA 13.1 (Statistics/Data Analysis, Copyright 1985–2013 StataCorp 4905 Lakeway Drive College Station, TX). Descriptive statistics are expressed in terms of frequencies, percentages or median and range. Bone marrow core plasma cells category percentages were estimated as the category range midpoint values as reported in pathology records.

Categorical variables were tested by chi-square or Fisher exact tests and continuous variables were tested by Mann–Whitney U test. A p-value of 0.05 or less was considered significant. Survival curves were created using the Kaplan–Meier method and significance was assessed using the log-rank test.

For describing drug regimens and their treatment responses, drug subgroup sample sizes were insufficient to support any detailed statistical analysis of the efficacy of five different regimens considered individually. Instead, statistical analysis of the likelihood of a hematologic treatment response (the patient's best observed response) was analyzed for each the five drug classes, irrespective of whether they were given as initial or as subsequent therapy after initial treatment failure. Then, an analysis was performed to validate that in general, a favorable hematologic response to therapy is associated with a significant increase in survival for this rare disease.

**Results:** The presenting demographic profiles and clinical features of the 95 IgM AL amyloidosis patients in the overall 1996–2012 case series are given in Table 1. Only two patients in the case series had a monoclonal IgM paraprotein greater than 3.0 g/ dL and none had hypercalcemia. The immune serology and immunopathological findings at the initial clinical presentation are provided in Table 2. The median age at diagnosis was 66 years, ranging from 38 to 89 years; 53 patients were male and 42 were female (56% and 44%, respectively). Overall, 61% had elevated serum IgM levels: the median serum IgM was 584 mg/dL (range: 29–9130). The median serum IgM paraprotein (M-Spike) was 0.64 g/dL (range 0.50–5.76). For the overall case series, the baseline median serum k FLC was 19.7 mg/L (range: 0.15–6992) and median serum _ FLC was 33.4 mg/L (range 5.8–12160). The clonal population had a lambda light chain restriction in 50/72 (69%) of patients. The percentage of patients with either an involved k or _ FLC level 4100 mg/L in the overall case series was 36%. The median absolute difference between FLCs (dFLC) was 47.3 mg/L (range 0.70–5168).

The most commonly clinically involved organs in the overall case series were the kidney (51%) followed by heart (40%), the lymph nodes (25%), 2 M. Sissoko et al. Amyloid, Early Online: 1–7 Downloaded by [Moussa Sissoko] at 23:15 01 November 2015 gastrointestinal tract (17%), and the liver (12%). Lung involvement occurred in 9% of patients, while the nervous system and soft tissue were each affected in 7% of cases. Two cases had peripheral nerve involvement and five had autonomic nervous system disease (one case had both). Other anatomical sites were involved in 13% of cases; these included the thyroid, breast, tongue, and palate among others. These estimates are on an organ system basis and are not mutually exclusive; 48% of our cases had one clinically involved organ; 24% had two and 28% had three or more organs involved at presentation.
Immunohistochemical examination of bone marrow specimens for the overall series (Table 2) revealed that 42 of 58 (72%) of biopsied patients had clonal plasmacytosis; whereas 28% of specimens were unable to diagnose plasma cell or lymphoplasmacytic neoplasm at the time of initial presentation.

In the bone marrow core biopsy pathology results, 11% of specimens were categorized with 0–5% plasma cells; 59% of specimens had 5% plasma cells; 13% had 5–10% plasma cells; and 18% had more than 10% plasma cells. In other clinical laboratory studies, the presenting blood hemoglobin levels ranged from 7.6 to 17.2 g/dL, and only 6% of patients had a hemoglobin level less than 10 g/dL. The median serum b-2 microglobulin was 3.5 g/dL. Fifty percent of the overall case series had an elevated serum b-2 microglobulin level (43.5 mg/L) and 24% had marked elevations (45.5 mg/L).

**Book Chapters**


**2015 Published Journal Articles:**


   **Abstract:** We reviewed 10 cases of thrombotic thrombocytopenic purpura (TTP) following cardiac surgery since November 1998. The object of the study was to define the natural history of post-CABG-TTP and to assess response to therapy. All patients underwent CABG; four also underwent aortic valve replacement and six mitral valve replacement. Eight patients had mental status changes and/or unexplained fever. All patients received plasmapheresis ranging from 5 to 24 days and nine required hemodialysis or continuous renal replacement therapy. All had significant improvement in their platelet count, LDH, renal function, and mental status changes at discharge. None of the five surviving patients has relapsed at follow-up ranging from 8 months to 6 years. Early recognition of this syndrome and early institution of plasmapheresis are important for a favorable outcome.

Abstract: Significant age-related variation in chemotherapy use has been observed among elderly patients with metastatic breast cancer (MBC), which may be partly attributable to geographic access factors such as local area physician practice culture and local health care system capacity. The purpose of the paper was to examine how age may modify the effect of geographic access on chemotherapy use in elderly patients with MBC. This was a retrospective cohort study based on the surveillance, epidemiology and end results-Medicare-linked database of 1992-2002. Chemotherapy use was defined as at least one chemotherapy-related claim within 6-month post-diagnosis. Geographic access to cancer care was measured by four variables: patient travel time to the nearest oncologist practice, local area per capita number of oncologists, local area per capita number of hospices, and local area chemotherapy rate. Using multivariate logistic regression model, both aggregate models with interaction terms and subgroup analyses were conducted. Among 4,533 elderly with MBC, 30.16% used chemotherapy. Chemotherapy use decreased with age. Both the aggregate model with interaction terms and the subgroup analysis showed that local area chemotherapy rate was positively associated with chemotherapy use (P = .0004 in the whole group; in the subgroup analyses, P < .0001, P = .0006, P = .0006, P = .18, P = .026, respectively). In addition, subgroup analysis showed that, among patients aged 85+ years old, local area oncologist supply was negatively associated with chemotherapy use (P = .028). The impact of geographic access to cancer care is the greatest among the oldest group, for whom the clinical evidence is the least certain.

2015 Conference Proceedings

Background: Recently, adjuvant chemotherapy has become the standard of care for completely resected (R0) stage II and IIIA NSCLC patients; up for debate is the use of adjuvant therapy for stage IB. This retrospective study examined the therapies used in completely resected NSCLC patients.

Methods: Information was initially gathered from the CAMC Cancer Registry which recorded nearly 2,500 occurrences of lung cancer during the study period (2005-2012). Those with completely resected (R0) stage IB (tumor size ≥ 4 cm) through IIIA (R0) NSCLC were selected for further review. Patients who did not receive preoperative therapy were included.

Results: Meeting inclusion criteria were 171 patients, 96% Caucasian, with an average age of 66 ± 10 years (range 40-86). The majority were male (66%), 63% were married, and 55% had Medicare/Medicaid and most underwent a lobectomy (82%) Stages included IB (26%), IIA (23%), IIB (35%), and IIIA (16%), with 46% adenocarcinoma and 42% squamous cell. Adjuvant treatment type by stage is presented in Table 1. The majority of those not receiving treatment refused or elected observation (52%), while 16% were not treated due to comorbidities and 12% expired within 2 months of surgery.
Logistic regression revealed that those who were treated were age < 65 years (odds ratio 3.3, CI 1.6-7.1, p = .002), stage IIIA (odd ratio 2.0, CI 1.3-2.9, p < .0005) and stage IIB (odd ratio 1.3, CI 1.0-1.7, p < .03).

Conclusions: Adjuvant therapy was seen more in stages IIB and IIIA. Stage IIIA received the highest rate of radiation. Of the patients who underwent treatment the majority received treatment that is compliant with NCCN guidelines. Unfortunately only 2 of the patients who received treatment were part of a clinical trial. The proportion of patients treated, was similar to the NCCN Outcomes Data Project of Zornosa C, et al.

2015 Ongoing Research
1. Evaluation of Chemotherapy with the Last 2 Weeks of Life: Patterns of Care at CAMC
Steven J. Jubelirer, MD, Frank A. Lacy BA, MS2, Christine A. Welch, MS

Background: ASCO identified chemotherapy at the end of life as a main practice that, if stopped, could improve patient care and reduce healthcare costs. ASCO Quality Oncology Practice Initiative identifies “no chemotherapy within the last 2 weeks” as a metric for quality end-of-life care.

Objective: The purpose of this study is to determine the number of patients who received chemotherapy 2 weeks before death and to determine the factors that had potential to influence chemotherapy use at the end of life.

Results: Thus far the records of 522 patients have been reviewed for the year 2014. The study population was 51.0% male, 96.8% Caucasian, with an average age of 69.13 ± 12.4. Progression of cancer with metastasis occurred in 29.1% and 21.2% expired in the hospital. There were 4.2% who received chemotherapy in the last 2-weeks of life and those were significantly younger p = .01 and were more often inpatients when they died, (p < .0001) than those who did not receive chemotherapy in the last 2 weeks. The study population was subdivided into solid tumor and hematologic malignancies and no differences were seen in the percentage receiving chemotherapy in the last 2 weeks, gender, age, ethnicity, number of comorbidities or location of death.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Treatment category</th>
<th>IB (N=45)</th>
<th>IIA (N=40)</th>
<th>IIB (N=59)</th>
<th>IIIA (N=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No treatment (total)</td>
<td>33 (75%)</td>
<td>24 (60%)</td>
<td>31 (52.5%)</td>
<td>6 (22.2%)</td>
</tr>
<tr>
<td></td>
<td>Cisplatin-based</td>
<td>7 (15%)</td>
<td>9 (22.5%)</td>
<td>12 (20.3%)</td>
<td>9 (33.3%)</td>
</tr>
<tr>
<td></td>
<td>Carboplatin-based</td>
<td>4 (8.9%)</td>
<td>6 (15%)</td>
<td>9 (15.3%)</td>
<td>2 (7.4%)</td>
</tr>
<tr>
<td></td>
<td>Sequential chemo/RT</td>
<td>1 (2.5%)</td>
<td>1 (1.7%)</td>
<td>6 (10.2%)</td>
<td>7 (25.9%)</td>
</tr>
<tr>
<td></td>
<td>Concurrent chemo/RT</td>
<td>6 (13.3%)</td>
<td>7 (25.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RT alone</td>
<td>1 (2.2%)</td>
<td>1 (2.5%)</td>
<td>3 (11.1%)</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion: Based on this 1-year data set it was found younger patients are more likely to receive chemotherapy in the last 2 weeks of life. Patients receiving chemotherapy in the last 2 weeks of life are more likely to die in the hospital. These findings need to be supported with a larger cohort. In addition, a prospective study design would be more detailed and definitive for determining why patients receive chemotherapy in the last 2 weeks of life.

2. A Prospective Study of Patient Satisfaction in an Oncology Unit. This study uses The European Organization for Research and Treatment of Cancer (EORTC) IN-PATSAT32 to evaluate in patients satisfaction and makes comparisons to the HCAPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey.

Does Patient Knowledge of the Location of Their Cancer Affect Their Satisfaction With Their Care?
Nagabhishek Moka, MD, Steven J. Jubelirer, MD, Christine A. Welch, MS, Martha B Taylor, RN, OCN

Background: The European Organization for Research and Treatment in Cancer (EORTC) developed the EORTC-IN-PATSAT32 survey for in-patient satisfaction (use permission granted).

Purpose: The purpose of this study was to determine the ability of the patients to correctly identify aspects about their cancer and to determine the influence on satisfaction.

Methods: The EORTC-IN-PATSAT32 survey administered after consent, at discharge on an oncology floor at a large university affiliated community hospital. Comparisons were made to Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) which were collected during the same time period.

Results: Preliminary analysis shows the average age of those completing the 244 surveys was 61 ± 12 (range 18-86). Fifty percent were males, 96% were Caucasian, 64% were married, 50% had a high school education or less, 19% were living by themselves while 81% were in a household of 2 or more, 3% were enrolled in a clinical trial, 74% had researched illness on the internet, and 33% were working part or full time. Seventy three patients (30%) of the population incorrectly indicated or did not know the anatomic location of their cancer.

All patients (n = 7) enrolled in a clinical trial correctly identified the location of their cancer while 70% of those not in a clinical trial knew the location of their cancer. There was no difference in patient satisfaction between those who could or could not correctly identify the anatomical location of their cancer. In regression analysis the odds ratio for those who were more likely to know the anatomical location of their cancer were; females were 1.8 (95% CI: 1.0 – 3.2) and married subjects were 2.1 (95% CI: 1.2 – 3.7).

Conclusions: Thirty percent of patients did not know the anatomic location of their cancer. However, this knowledge did not seem to affect their satisfaction. This needs to be confirmed in a larger study.

3. Jubelirer (Co - PI) 10/2013 - present
The role of metformin in prolonging survival in renal cell carcinoma. A collaborative investigation with WVU –Morgantown to discern the factors associated with survival in renal cell carcinoma and to further examine the subset of diabetics and the effects of those taking metformin at diagnosis.

4. Clinical Utility of Molecular profiling of tumors of unknown primary at CAMC
Sana Farooki, MD, Steven Jubelirer, MD, Christine Welch, MS
Background: Molecular profiling of biopsy specimens can be used to identify a tissue of origin in the majority of carcinoma of unknown primary (CUP) site patients. CUP account for 4 to 5% of all invasive cancers.

Methods: Surgical or core needle biopsies from previously untreated CUP patients were submitted for determination of a primary site by a 92-gene RT-PCR assay in a clinical trial conducted by bioTheranostics, Inc.

Results: There were 19 patients from CAMC that were entered this trial, who had an average age of 66.6 ± 13.6 (range 40 to 88), which included 73.7% (n = 14) females and all were Caucasian. At presentation the majority 27.8% were thought to have lung cancer followed by ovarian cancer (11.1%). The suspected diagnosis was correct 22.2% of the time with the final diagnosis for these patients being ovarian 18.8%, with the next highest type being 12.5% of each cervical, colon, gall bladder, kidney, and lung. Overall the assay provided a molecular diagnosis in 94.7% of the cases. Nine patients receive chemotherapy four of whom received carboplatin/taxol, two with cisplatin/gemcitabine and two with FOLFOX.

Conclusion: Molecular profiling (bioTheranostics) of tumor specimens in a significant number of patients with CUP led to good responses to appropriate chemotherapy.

INCIDENCE OF OTHER MALIGNANCIES IN THE PATIENTS WITH MANTLE CELL LYMPHOMA

Sandhya Talakokkla MD, Renuka Mahatra, Christine Welch, Arun Nagarajan MD.

Background: Mantle cell lymphoma is a B cell lymphoma (CD5 +) which represents 5-10 % of Non-Hodgkin’s lymphoma. Most patients have advanced disease at presentation and thus carry a poor prognosis. This type of uncommon malignant lymphoma has a distinct and recurring cytogenetic abnormality involving t(11, 14) q(13, 32). Although extra nodal involvement is common, not many cases of MCL having concomitant other malignancies are reported. We hypothesized that patients with MCL have chronic immunosuppression, comparable to chronic lymphocytic leukemia patients, and therefore are at risk for developing secondary malignancies similar to CLL patients. The aim of our study is to report the retrospective analysis of patients diagnosed with MCL and the associated secondary malignancies before or after the diagnosis of MCL.

Patients and methods: The records of 41 patients who presented with MCL to “The David Lee Cancer Center” at CAMC, WVU with MCL from 2000 – 2015 were retrospectively reviewed. The number of other malignancies presenting before or after the diagnosis of MCL were analyzed.

Results: The population with MCL was represented by 41, all Caucasian patients, which were 75.6% male (n = 31) and had an average age of 68.6 ± 11.3 years. Mean follow up for all patients was 23.9 ± 32.43 months. A total of 14.6% (n=6), 83.3% males, experienced a second primary. Within the second primaries 50.0% were GI cancers which included pancreatic cancer and cholangiocarcinoma while
16.7% were prostate cancer, diffuse large B-cell lymphoma or adenocarcinoma of lungs. The time to second primaries varied with 50% of the cases being diagnosed simultaneously with MCL, while 33.3% were diagnosed prior to MCL at an average time of 34.5 months, and 16.7% were diagnosed post MCL diagnosis at an average time of 18 months.

**Conclusion:** Patients with MCL are typically CD5 positive, CD10 negative, and CD23 negative which make it different from other lymphomas like small cell lymphoma, B-cell CLL that are CD 23 positive. Rare cases of MCL may be CD5 negative or CD23 Positive. We hypothesized that MCL patients have an increased risk for developing secondary cancers due to their disease biology and from underlying chronic immunosuppression. Patients with MCL have twice the risk of developing secondary malignancies and an increased frequency of certain types of cancers such as cholangiocarcinoma & pancreatic cancer.

**Keywords:** MCL, other malignancies, Non-Hodgkin’s lymphoma, t (11, 14) (q 13, q32)
Comprehensive Assistance with Resources and Education (CARE) Team

By Jennifer Hancock, PsyD, Psychologist

The Comprehensive Assistance with Resources and Education (CARE) Team is nestled on the first floor of the CAMC Cancer Center in the Patient Resource Center. This multi-disciplinary team consisting of nurse navigation, financial navigation, social work, psychology, and nutrition helps patients address stressors and barriers which may interfere with their cancer treatment and care, including transportation and health insurance concerns, home health concerns and Medical Power of Attorney, emotional distress and nutrition concerns. Patients can also obtain free information on their specific disease in the Patient Resource Center.

Referrals to the CARE Team are multi-faceted. An initial visit with the oncologist also includes a visit with a CARE team member who completes an assessment of any potential barriers or stressors which may impede care, and aids the patient in accessing resources. At every oncology appointment, patients complete the Distress Thermometer, a screener to assess for distress related to various domains including practical and financial, emotional, spiritual and physical concerns. High distress scores trigger a consultation with the appropriate CARE team member. Patients can also call or stop in at the Patient Resource Center and speak with someone.

As a Quality Oncology Practice Initiative (QOPI)-certified site, the only cancer center in West Virginia to receive this distinction, we strive for excellence. During the re-certification process this year, we received excellent marks for our distress screening program.

For the past two years, behavioral health services have included individual and group therapy for patients and their caregivers. With the opening of the new cancer center, two new services have been added to the existing cancer support program: counseling for children and a program for newly diagnosed patients.
Gigi’s Place is an area dedicated to the emotional and psychological well-being of children who have a loved one undergoing treatment or who have lost a parent to cancer. Counseling services are provided to children by a licensed child psychologist. Gigi’s Place was created in honor of a young mother who lost her battle with cancer.

The CAMC Cancer Center also offers From Cancer to Health™, a program to help people recently diagnosed with cancer, including those undergoing treatment, to manage the stress of diagnosis and treatment. Led by a licensed psychologist, From Cancer to Health™ empowers people with cancer through group or individual sessions designed to teach effective strategies and techniques to better cope throughout the cancer journey. Research shows that patients participating in a trial of From Cancer to Health™ demonstrated less stress. In addition, participants developed stronger immune systems, experienced greater social support, kept healthier diets, and had fewer physical side effects from treatment.

The CARE Team is also equipped to provide smoking cessation classes. Our lung cancer navigator recently completed the Tobacco Treatment Specialist (TTS) Certification Program at Mayo Clinic, a nationally accredited program that embraces and appreciates the cultural diversity of participants. In addition, five staff members have become smoking cessation facilitators by completing the required training by the American Lung Associations Freedom From Smoking program. Five of the 7 participants in the first 8-week session successfully quit smoking. Future classes are planned.

To talk with someone from our CARE Team, please stop by the Patient Resource Center, call 304-388-8612 or email CancerSupport@camc.org.

For more information about Gigi’s Place, call (304) 388-9690 or visit camc.org/cancercenter.

To learn more about From Cancer to Health™, contact The CAMC Cancer Center Patient Resource Center at (304) 388-8612, email CancerSupport@camc.org or visit cancertohealth.osu.edu.
CAMC Radiation Oncology Services

Created in 2014, CAMC Radiation Oncology Services is a joint venture between Alliance Oncology, a division of Alliance HealthCare Services, Charleston Area Medical Center, and Charleston Radiation Therapy Consultants (CRTC).

In the summer of 2015 CAMC Radiation Oncology Services moved the department to the first floor of the new CAMC Cancer, located at 3100 McCorkle Ave., in Charleston West Virginia. The move unites radiation oncology with the other cancer services provided at the state-of-the-art center, bringing comprehensive outpatient cancer services under one roof. At approximately 15,000 square feet, the new clinic is much larger than the previous location’s 9,000 square feet, and will provide an expanded and comfortable setting for patients to continue receiving the most advanced and personalized cancer treatment available.

CAMC Radiation Oncology Services treats early-stage, recurring and advanced cancer using several forms of radiation therapy technologies, including two new state-of-the-art linear accelerators called TrueBeam™ systems, one of the most advanced cancer treatment options available. The TrueBeam system with RapidArc® Radiosurgery and Real Time Patient Tracking, delivers radiation therapy and radiosurgery treatment to cancerous and noncancerous tumors in the brain and body. TrueBeam treatments offer several benefits for patients, particularly in regards to quality-of-life issues faced during cancer treatment.

The radiation oncology department team consists of five American Board Certified radiation oncologists, three full-time American Board Certified medical physicists, dosimetrists, radiation therapists, radiation oncology nurses, support staff and a site administrator. The physicians of Charleston Radiation Therapy Consultants are experts in radiation oncology with decades of clinical experience. At CAMC Radiation Oncology Services, the entire radiation team works closely with patients, their physicians and surgeons to develop customized treatment plans for each case.
Radiation Treatment at CAMC:
Radiation therapy has been used for more than a century to treat cancer. The treatment is performed as an outpatient procedure with little to no recovery time. Radiation therapy treatment sessions are quick and painless. With minimal to no side effects, most patients return to their normal daily routines following each treatment appointment.

At CAMC Radiation Oncology Services we offer several types of radiation therapy designed to treat all forms and stages of cancer and some noncancerous conditions:

- Stereotactic radiosurgery and body radiation therapy (SRS/SBRT)
- Intensity modulated radiation therapy (IMRT)
- External beam radiation therapy (EBRT)
- 3-D conformal therapy
- 4D (four-dimension) CT-based treatment planning
- Image guided radiation therapy (IGRT)
- High Dose Rate Brachytherapy (HDR)
- Mammosite Brachytherapy (Accelerated Partial Breast Treatment)
- Prostate Seed Brachytherapy
- Pediatric Radiation Therapy
- Superficial Radiation Therapy (Skin Treatment)

Stereotactic Radiosurgery & Body Radiation Therapy (SRS/SBRT)
At CAMC Radiation Oncology Services, SRS and SBRT are performed using one of the most advanced treatment options, the TrueBeam™ STx®. The TrueBeam STx provides noninvasive treatment of malignant and benign tumors and lesions located in the head and neck and throughout the body.

The precision of the TrueBeam STx system is measured in increments of less than a millimeter. This accuracy is made possible by the system’s sophisticated control system, which choreographs imaging, patient positioning, motion management, beam shaping and dose delivery, performing accuracy checks every ten milliseconds throughout the entire treatment. This allows our experienced physicians to “see” the tumor they are about to treat and apply very accurate and precise beams of radiation to it while compensating for movement.

TrueBeam STx offers several benefits for patients, particularly in regards to quality-of-life issues that may be dramatically impacted by other forms of treatment.
Key advantages of TrueBeam STx SRS/SBRT treatment include:

- Treatment is an outpatient procedure, painless and noninvasive
- Extreme precision minimizes radiation damage to normal tissue
- Beam shaping offers highly accurate and uniform treatment
- Short treatment times – about 15 minutes
- Monitors and corrects for minor patient movements during treatments
- Patients return to their normal routines with minimal to no side effects
- No overnight hospital stay required

SRS/SBRT treatment may be an option for patients with:

- Medically inoperable or surgically complex tumors, or those who seek an alternative to surgery or conventional radiation therapy.
- Recurrent cancer or metastatic tumors that have spread to other areas of the body from the main tumor site.
- A high risk of developing complications after surgery.

Intensity modulated radiation therapy (IMRT)

Intensity Modulated Radiation Therapy (IMRT) is a specialized form of 3DCRT that allows radiation to be more precisely shaped to fit the tumor. With IMRT, the radiation beam can be broken up into many “beamlets” and the intensity of each beamlet can be adjusted individually. This allows for better control over shaping the radiation delivery to the target volume while avoiding healthy tissue. In many situations, this can allow a higher dose to the tumor while improving normal tissue avoidance, increasing chance for cure.

3D Conformal Radiation Therapy (3DCRT)

In the past, radiation oncologists could only plan using two dimensions (width and length), due to limitations in imaging technology. With current advanced imaging and computer technology, CRTC’s radiation oncologists can plan treatment in three dimensions (length, width and depth). This process is known as 3D Conformal Radiation Therapy (3DCRT).

The process starts with a CT scan, which gives a three dimensional picture of the patient’s body, including the tumor to be treated as well as all normal anatomy. This picture can be supplemented with additional information from other 3D images such as PET and MRI scans which can be “fused” or superimposed with the planning CT. Using this picture as a map of the
body, the Radiation Oncologist identifies the target to be treated and any sensitive healthy tissue that needs to be avoided. The Radiation Oncology team then uses powerful computers to design a radiation treatment plan with multiple beams aimed at the target. Each beam is shaped to deliver the optimal dose to the target, while avoiding surrounding sensitive normal structures. Thus, the radiation “conforms” to the target volume.

**Image Guided Radiation Therapy (IGRT)**
The Radiation Oncology department at CAMC offers the most advanced Image Guided Radiation Therapy currently available. We utilize daily visualization and tumor motion tracking using state-of-the-art technology that provides for day-to-day accuracy to within one to two millimeters. 3D-CRT/IMRT is further enhanced with use of daily image guidance (IGRT). One challenge that the radiation oncology team faces is how to accurately and consistently position the patient for their daily treatments. Tumors are not always where they are expected to be because of patient movement/breathing and normal tissue filling (GI tract, rectum, bladder, etc.) which can change between each treatment and during treatment. With IGRT an image is obtained daily before and during radiation treatments. This identifies precisely where the tumor and other critical normal structures reside at the most important time, when the treatment is being given. In some cases, we implant a tiny piece of metal called a fiducial marker near or in the tumor to further help localize the tumor during IGRT. Changes in set up can be made to insure optimal daily targeting.

**4D (four-dimension) CT-based treatment planning**
A technique that provides information to help plan when breathing impacts tumor motion. This allows us to conform the radiation dose to the tumor’s motion. By accounting for tumor motion during breathing, doses to critical normal organs can be limited allowing the delivery of higher doses to the tumor. This tool is used along with stereotactic body radiation therapy.

**Superficial Radiation Therapy (Skin Treatment)**
Radiation therapy is an extremely effective method for treating (non-melanoma) skin cancer. Non-melanoma skin cancer includes basal cell and squamous cell skin cancers. Superficial (on the skin) treatment for such skin cancers can be provided by a special machine that has a better ability to treat the skin while avoiding and preserving underlying tissues. Radiation treatment for skin cancer (non-melanoma) has excellent control rates and cosmetic outcome. Such treatment allows many patients to avoid the alternative option of surgery, which can often result in scarring/cosmetic changes.
High Dose Rate Brachytherapy (HDR)
High Dose Rate Brachytherapy (HDR), also referred to, as “internal radiation therapy” is a radiation treatment, which uses a small radioactive source temporarily, placed inside or near the tumor. Interstitial HDR Brachytherapy is performed for Soft tissue sarcomas as an adjunct to surgery. Intracavitary HDR Brachytherapy is provided as a definitive treatment (along with external beam radiation) for advanced uterine cervix cancer and as an adjunct (alone) following hysterectomy for higher risk uterine endometrial cancer.

Under computer control the position and timing of the radiation source placement can be precisely controlled, allowing the physician to shape the radiation dose to the target.

Because of the high dose rate characteristics, this brachytherapy treatment is provided during a short time frame on an outpatient basis. This avoids the hospitalization (and related complications with extended patient immobilization) that was required with previous low dose rate techniques (LDR).

Mammosite Brachytherapy (Accelerated Partial Breast Treatment)
Mammosite Brachytherapy is a treatment option for selected early stage breast cancer in conjunction with a lumpectomy. This treatment option uses an Iridium-192 radioactive source, which delivers radiation to the lumpectomy cavity (partial breast) by way of a mammosite balloon. At the time of the lumpectomy or shortly after, the surgeon will place the deflated mammosite balloon into the cavity, which is inflated by catheter conforming to the lumpectomy cavity before the radiation delivery. This radiation treatment is delivered two times a day for five days as opposed to standard fractionated treatment, which is delivered daily for five to six weeks.

Prostate Seed Brachytherapy
With this technique, radiation can be delivered to the prostate alone by implanting radioactive seeds (permanent seed implants using Iodine-125 or Palladium-103). For high risk category prostate cancer the seed brachytherapy should be combined with a shortened course of external beam radiation therapy (5 weeks). For low risk category prostate cancer the seed brachytherapy is provided alone. The major advantage for seed implant is the ability to give a high radiation dose while confining the treatment more tightly to the prostate, which leads to excellent tumor control and fewer long-term complications. Prostate brachytherapy is a combined effort where radiation oncologists perform this procedure along with urologists. The Prostate Brachytherapy program has been refined at CAMC for nearly 10 years representing one of the strongest experiences in the state.
The recommendation for prostate seed brachytherapy (implants) depends on a number of patient and tumor factors: this includes pre-treatment prostate size, urinary symptoms, previous prostate surgical history (TURP), cancer risk profile (low vs. intermediate vs. high risk category), and the patient’s surgical candidacy and desires.

Depending on these factors many patients may better be served by treating the prostate with Stereotactic Body Radiation Therapy (SBRT) or external beam radiation therapy (IMRT/IGRT) or prostatectomy. The breadth of treatment options available allows the physician and patient to select the specific treatment, which is best suited to each patient’s particular medical needs. At CAMC Radiation Oncology Services, we strongly favor a multidisciplinary approach for making decisions regarding optimal treatment for prostate cancer and encourage patients to seek consultations with a urologic surgeon as well as a radiation oncologist. The team of radiation oncologists, urologists, and medical oncologists meet regularly during “peer review conference” where we collectively review and discuss optimal treatment options for urologic cancer cases.

**Pediatric Radiation Therapy**

Radiation treatment is often an integral part of optimal treatment for cancers in the pediatric population. Depending on each child’s specific diagnosis, radiation therapy may be used as the primary form of treatment, or may be used before or after other types of treatment such as surgery or chemotherapy. CAMC Radiation Oncology Services are on the leading edge in offering state-of-the-art radiation therapy options for childhood cancer. The pediatric radiation therapy program builds upon CAMC’s well established and experienced Pediatric Oncology department. Along with CAMC pediatric oncologists and their staff, the radiation oncologists, medical physicists, and other scientists actively participate in research through the national Children’s Oncology Group (COG).

**Radiation Oncology Research and Education**

CAMC Radiation Oncology Services is dedicated to providing patients with the most up-to-date radiation treatment options. We are affiliated with the internationally renowned Radiation Therapy Oncology Group (RTOG) and offer enrollment in RTOG clinical trials for qualifying patients. Through this affiliation, multiple clinical trials for patients with higher risk prostate cancers have recently been made available for enrollment. The radiation oncologists also participate as assistant clinical professors for the WVU School of Medicine and offer elective educational rotations for medical students as well as for CAMC training Resident doctors interested in oncology. The multidisciplinary approach to cancer care coupled with the use of cutting edge technologies and dedication to research and education help provide better outcomes and experiences for patients.
Top Cancer Sites by CAMC Experience
Erin Coffindaffer, CTR

2014 CAMC Top Cancer Diagnoses by Gender

<table>
<thead>
<tr>
<th>Primary Site</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>16.3%</td>
</tr>
<tr>
<td>Lung and Bronchus, non-small cell</td>
<td>14.8%</td>
</tr>
<tr>
<td>Colon and Rectum</td>
<td>11%</td>
</tr>
<tr>
<td>Bladder</td>
<td>7.2%</td>
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<tr>
<td>Kidney and Renal Pelvis</td>
<td>5.9%</td>
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<tr>
<td>Non-Hodgkin's Lymphoma</td>
<td>4.6%</td>
</tr>
<tr>
<td>Pancreas</td>
<td>3.9%</td>
</tr>
<tr>
<td>Melanoma</td>
<td>3.4%</td>
</tr>
<tr>
<td>Leukemia</td>
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<tr>
<td>Esophagus</td>
<td>3%</td>
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<td>Stomach</td>
<td>2.9%</td>
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<tr>
<td>All other sites</td>
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<table>
<thead>
<tr>
<th>Primary Site</th>
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<td>Cervix Uteri</td>
<td>2.5%</td>
</tr>
<tr>
<td>Leukemia</td>
<td>2.4%</td>
</tr>
<tr>
<td>All other sites</td>
<td>17.6%</td>
</tr>
</tbody>
</table>
Cancer Registry
Erin Coffindaffer, CTR

Cancer Registries have existed since 1913 as a means to systematically collect diagnostic and treatment data on cancer patients. This data collection involves cancer occurrence type, extent, treatment and outcomes as reported both nationally to the National Cancer Data Base (NCDB) and to the West Virginia state cancer registry. As an accredited cancer program with the Commission on Cancer (CoC), Charleston Area Medical Center is required to maintain a cancer data registry to collect information on all patients diagnosed and/or treated at a CAMC facility.

Since the NCDB was formed in 1989 physicians, researchers, facilities, and other interested parties have a means by which we can study the efficacy of cancer treatments for cancers diagnosed at varying stages of disease. A facility can compare performance with the other CoC accredited facilities to assist in evaluating and improving patient outcomes. A researcher can use this data to help identify when one treatment is more effective than another. Such as the case with the treatment of breast cancer when data showed that breast conserving therapies were as effective as the radical mastectomies performed in the past and resulted in major changes in how breast cancer has been treated in recent years.

Throughout this annual report there are graphs of data collected by CAMC’s cancer registry demonstrating how CAMC compares to other CoC accredited facilities. The following statistics may be of interest:

- CAMC has the highest volume for cancer care in West Virginia
- In 2014, CAMC accessioned 1,838 new cancer patients into the registry. CAMC has a total of 46,792 cancer cases in the cancer registry database. Of this total population 37,957 patients have been diagnosed and/or treated since January 1, 1985.
- CAMC’s follow-up rate of all patients in the registry is currently 90.61%, well above the CoC’s required standard of 80%. Likewise, CAMC’s follow-up rate for patients diagnosed within the past five years is at 91.05%, above the required 90% rate.
- The CoC replaced the abstracting timeliness standard, which encouraged facilities to collect cancer information and initial treatment data within six months from the date of first contact, in January 2014; however CAMC continues to maintain an average abstracting timeliness of 5.52 months for 2014.
- The annual Call for Data for the NCDB was performed on Jan. 23, 2015, and resulted in zero quality problems and zero cases being rejected on the first submission. This awards CAMC a commendation from the CoC.
Furthering the need for an educated and skilled workforce, CAMC has committed to sending each registrar to a national meeting once every three years. Ebenetta Rhinehart attended Survey Savvy in June 2013; Melissa Roebuck attended Survey Savvy in June 2014; Susan Thompson attended the National Cancer Registrar Association’s (NCRA) annual meeting in May 2014; Marsha Crowder attended the NCRA annual meeting in May 2015; and Erin Coffindaffer attended Survey Savvy in June 2015.

Registrars attend the West Virginia State Cancer Registrar’s Meeting annually. CAMC also provides training through monthly webinars from the NCRA and the North American Association of Central Cancer Registries (NAACCR).

The CoC now requires personnel working in the cancer registry to obtain the Certified Tumor Registrar (CTR) credential within three years. This standard was implemented Jan. 1, 2015. CAMC recognized the importance of having educated staff in the registrar role and began enrolling all registry staff in training programs well before the CoC made this requirement Jan. 1, 2015. Currently all staff are either credentialed or in the process of testing for the credential. CAMC is proud to have more credentialed staff than any other facility in West Virginia. Credentialed staff members include:

- Erin Coffindaffer, CTR
- Marsha Crowder, CTR
- Melissa Roebuck, CTR
- Susan Thompson, CTR
- Ebenetta Rhinehart, MBA, RHIA, CCS, CTR
Lung cancer accounts for about 27 percent of all cancer deaths and is by far the leading cause of cancer death among both men and women. Each year, more people die of lung cancer than of colon, breast and prostate cancers combined.

Dr. Nathan Kister, a cardiothoracic surgeon hopes a dedicated clinic at CAMC will move lung cancer patients to the forefront of care.

“Lung cancer is the second most common cancer in both men and women, but is the number one cause of cancer death in both groups. Unfortunately we don’t usually find it until it’s too late,” Dr. Kister said.

He’s hoping that new programs that CAMC is instituting such as a lung cancer screening CT scans will help detect the cancer sooner which will lead to more lives saved.

“One of the big advances in lung cancer in the past year is that the U.S. Preventative Services Task Force recommends an annual screening for lung cancer with low-dose computed tomography in adults aged 55 to 80 years who have smoked more than 30 years smoking history and currently smoke or have quit within the past 15 years,” Kister said. Since being adopted by the U.S. preventative task force nearly all insurances now cover this to detect early stage lung cancer in these high risk groups. Initial studies have shown that these screening CT scans can decrease the deaths by lung cancer by up to 20%.

After a patient is found to have a lesion on imaging that is concerning for a malignancy a dedicated team of CAMC physicians including thoracic surgeons, pulmonologist, radiologist, and oncologist can help determine if the patient does have cancer, and if so how to best go about treating it.

Physicians practicing at CAMC are using the latest technologies and techniques to both diagnose and treat lung cancer patients.

“Interventional pulmonary programs that include endobronchial procedures need an armamentarium of therapeutic modalities rather than a single invasive approach to manage patients with complicated lung cancer, said Dr. Paras Malhotra, who specializes in interventional pulmonary, pulmonary disease and critical care medicine. “As each patient’s anatomy differs, the manner in which the patient’s cancer leads to symptoms varies. Several procedures used in conjunction (eg, laser and stenting) may be necessary to provide the most efficacious management of the disease.”

The superDimension system uses a bronchoscope to extend to regions deep within the lung. This provides a minimally invasive approach to accessing difficult-to-reach areas of the lung, which can aid in the diagnosis of lung disease and thereby lead to earlier, personalized treatment – potentially saving lives. Using sensors placed on the chest, a three-dimensional roadmap of the lung is transferred to a special software system to track the real-time position.
of the guide catheter (similar to a GPS in a vehicle). This targets lesions in the lungs. Once arriving at a target, the location sensor is removed and the guide catheter provides a channel for diagnostic or therapeutic tools.

After the diagnosis of cancer has been obtained, a group of physicians look at each patient individually to formulate a plan of care. This may include surgery, radiation, chemotherapy, or a combination of these modalities.

The goal of the screening CT scans is to find patients early when they can still be cured of the cancer. If a lung cancer is found early enough that cure is possible it usually involves surgery to remove that portion of the lung. We are currently performing the most up to date and hi tech lung surgery in which an entire lobe of the lung can be removed through small incisions in the chest either by using cameras and small instruments or the surgical robot. These surgeries spare patients of the large thoracotomy incisions that had traditionally been required for such procedures.

Many lung cancer patients have respiratory symptoms due to their disease. Shortness of breath, hemoptysis, and cough are often the complaints that bring patients to a physician and to the complex treatment programs currently used for the management of lung cancer. Some of these patients may benefit from endobronchial intervention as part of the management of their disease.

Patients with lung cancer often have bulky endobronchial disease, endobronchial extension or airway compression. Many endobronchial treatment modalities are available to supplement traditional therapies for advanced lung cancer. Endobronchial interventions are important adjuncts in the multimodality management of lung cancer and should become standard considerations in the management of patients with advanced lung cancer. For patients with respiratory symptoms associated with their disease, these interventions provide symptom palliation and improved quality of life. Many studies not only demonstrate improvement in clinical symptoms and quality of life, but also suggest increased overall survival with the use of endobronchial management techniques.

Stents are used when immediate treatment is needed to open the airway(s). Photodynamic therapy (PDT) destroys cancer cells with a drug called a photosensitizer, which makes cells very sensitive to light. Argon plasma coagulator (APC) is a monopolar electrosurgical procedure in which electrical energy is transferred to the target tissue using ionized and, thus, conductive argon gas (argon plasma), without the electrode coming into direct contact with the tissue.
A Look at Lung Cancer Care at CAMC, 2011 data from the National Cancer Data Base

Stage Distribution - Non Small Cell Lung Cancer Diagnosed in 2012, My Facility vs. All CoC

<table>
<thead>
<tr>
<th>Stage</th>
<th>My Facility</th>
<th>All CoC</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0.53% (n=11)</td>
<td>21.58% (n=274)</td>
</tr>
<tr>
<td>II</td>
<td>14.21% (n=27)</td>
<td>14.21% (n=27)</td>
</tr>
<tr>
<td>III</td>
<td>37.80% (n=72)</td>
<td>37.80% (n=72)</td>
</tr>
<tr>
<td>IV</td>
<td>0.53% (n=1)</td>
<td>0.53% (n=1)</td>
</tr>
<tr>
<td>OC</td>
<td>0% (n=0)</td>
<td>0% (n=0)</td>
</tr>
<tr>
<td>NA</td>
<td>11.05% (n=21)</td>
<td>11.05% (n=21)</td>
</tr>
<tr>
<td>UNK</td>
<td>3.06% (n=4824)</td>
<td>3.06% (n=4824)</td>
</tr>
</tbody>
</table>

In/Out Migration Non-Small Cell Lung Cancer, 2010 - 2012 - My Facility

<table>
<thead>
<tr>
<th>Year</th>
<th>Diagnosed Here and Treated Elsewhere</th>
<th>Diagnosed and Treated Here</th>
<th>Diagnosed Elsewhere and Treated Here</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0% (n=0)</td>
<td>84.29% (n=182)</td>
<td>15.74% (n=34)</td>
</tr>
<tr>
<td>2011</td>
<td>0.5% (n=1)</td>
<td>78.61% (n=158)</td>
<td>20.9% (n=42)</td>
</tr>
<tr>
<td>2012</td>
<td>0% (n=0)</td>
<td>68.42% (n=168)</td>
<td>11.56% (n=22)</td>
</tr>
</tbody>
</table>
Distance Traveled - Non-Small Cell Lung Cancer, 2012

<table>
<thead>
<tr>
<th>Percent (%)</th>
<th>&lt; 5 miles</th>
<th>5-9 miles</th>
<th>10-24 miles</th>
<th>25-49 miles</th>
<th>50-99 miles</th>
<th>100 miles</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My Facility</strong></td>
<td>1.05% (n=2)</td>
<td>17.37% (n=33)</td>
<td>30.53% (n=56)</td>
<td>22.11% (n=42)</td>
<td>23.88% (n=45)</td>
<td>5.26% (n=10)</td>
<td>0% (n=0)</td>
</tr>
<tr>
<td><strong>All CoC</strong></td>
<td>19.13% (n=23914)</td>
<td>21.99% (n=27406)</td>
<td>28.73% (n=35910)</td>
<td>15.07% (n=18060)</td>
<td>8.77% (n=10962)</td>
<td>4.93% (n=6163)</td>
<td>0.46% (n=568)</td>
</tr>
</tbody>
</table>

First Course Treatment Stage I Non-Small Cell Lung Cancer, 2012
My Facility vs. All CoC

<table>
<thead>
<tr>
<th>Percent (%)</th>
<th>Surgery Only</th>
<th>Radiation Only</th>
<th>Surgery &amp; Chemotherapy</th>
<th>Radiation &amp; Chemotherapy</th>
<th>Chemotherapy Only</th>
<th>Surgery, Radiation &amp; Chemotherapy</th>
<th>Other Specified Therapy</th>
<th>No 1st Course Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My Facility</strong></td>
<td>85.85% (n=27)</td>
<td>7.32% (n=3)</td>
<td>7.82% (n=3)</td>
<td>2.44% (n=1)</td>
<td>0% (n=0)</td>
<td>0% (n=0)</td>
<td>4.88% (n=2)</td>
<td></td>
</tr>
<tr>
<td><strong>All CoC</strong></td>
<td>58.8% (n=10178)</td>
<td>20.54% (n=8700)</td>
<td>36.8% (n=1238)</td>
<td>29.6% (n=971)</td>
<td>1.43% (n=465)</td>
<td>1.33% (n=434)</td>
<td>1.46% (n=477)</td>
<td>7.82% (n=2551)</td>
</tr>
</tbody>
</table>
Days to First Treatment Quartiles Non-Small Cell Lung Cancer: Cases Diagnosed and Treated at My Facility, 2012

Percent for my facility represents what percent of our patients were treated within the number of days in this table. The “national” benchmarks for CoC-accredited programs are represented by the Quartiles represented in the column.

Days to First Treatment Quartiles Non-Small Cell Lung Cancer: Cases Diagnosed at My Facility or Elsewhere; Treated at My Facility, 2012

Percent for my facility represents what percent of our patients were treated within the number of days in this table. The “national” benchmarks for CoC-accredited programs are represented by the Quartiles represented in the column.
CAMC Breast Center
Providing personalized, comprehensive and life-saving care

In April 2013, Amy Smith felt a lump on her breast while in the shower. At a routine appointment with her gynecologist two days later, she decided to mention it.

After examining the lump, her doctor immediately sent Smith for a mammogram and breast ultrasound at the CAMC Breast Center. Within an hour of receiving her test results, which showed a solid mass in her breast, Smith had a breast biopsy performed by Todd Witsberger, MD.

Two days later, Amy got the call confirming what she had feared – the lump was cancerous.

After thoroughly discussing her high risk family history and options with Dr. Witsberger, Amy elected to have a double mastectomy, which was performed four days later.

Smith is living proof of the importance of early detection, accurate screenings and rapid treatment.

“Many people don’t know what a breast center is,” said Roberto Kusminsky, MD, medical director of the Breast Center and professor and chairman, department of surgery, West Virginia University/ Charleston. “The main difference is that a breast center like the one at CAMC is a comprehensive system that cares for patients from beginning to end rapidly, using the skills of a multidisciplinary team of experts on a routine basis.”

The CAMC Breast Center takes a multifaceted approach to breast health, from routine screenings and diagnosis to innovative treatments and supportive care. It was the first of its kind in the state and the first to be fully accredited by the American College of Surgeons. It remains the only accredited breast center in the region.

The Breast Center team treats the largest number of patients with breast cancer in West Virginia. Board-certified surgeons specialize in all aspects of breast health. Experienced radiologists use the latest, most-advanced technologies to diagnose a full range of breast diseases.
The Breast Center’s services include:

- NEW 3-D mammography (known as digital tomosynthesis)
- Digital mammography
- Breast ultrasound
- Minimally-invasive breast biopsies
- Rapid diagnostic program and rapid consultation program (within 24-48 hours)
- Breast cancer risk assessment
- Genetic counseling
- Multidisciplinary care from breast specialists, surgeons and oncologists
- Nurse navigators to provide care coordination
- Bone density screenings
- Pelvic ultrasounds

New location

Formerly located at CAMC Women and Children’s Hospital, the Breast Center moved to the third floor of the new CAMC Cancer Center in May. At this location, patients have access to free parking and a separate, private entrance on the east end of the building where an elevator takes them directly to the Breast Center on the third floor.

“A lot of women don’t want to have to go through a cancer center to get their regularly-scheduled mammogram, so having our own entrance makes it easier to just walk in and get straight to our office,” said Missy Bohan, RN. “But for those women who are diagnosed with cancer, all of our oncology services are right here in the same building.”

Those services include medical oncology, radiation oncology, a boutique and wig shop, infusion therapy, retail and inpatient pharmacy, and patient resource center, among others.
New 3-D mammogram technology

The American Cancer Society recommends women above the age of 40 have mammograms every year, which is especially important for people who have a family history or are at higher risk for developing breast cancer.

A mammogram is an X-ray that produces a two-dimensional image of the breast so doctors can see problems not detectable by a regular breast exam. It is the best test physicians have to find cancer early and is critical to accurate and speedy treatment if cancer is detected.

With 3-D mammography (called tomosynthesis), patients who have a high risk of breast cancer or those with dense breasts can be examined more accurately. The Breast Center is the only facility in the area offering this type of 3-D mammography.

“An abnormal mammogram doesn’t necessarily mean cancer,” Kusminsky said. “There are a multitude of reasons that the test may show abnormal results, not just cancer. What is important is to remember that a normal mammogram still requires a breast exam because patients may have something we detect with a checkup that is not detectable by other means.”

If breast cancer is diagnosed, each patient’s case is discussed in a conference with a multidisciplinary team of experts including breast radiologists, board certified surgeons, medical oncologists, radiation oncologists, pathologists and reconstructive plastic surgeons. The resulting recommendations provide a personalized and unique plan of care with options that are considered best for each patient.

“No two cases are alike, so we take a personalized, multidisciplinary approach with each patient to ensure she receives the best care possible for her specific case,” said Stacey Copeland, MD.

In Smith’s case, her form of cancer was classified as a triple-negative form of breast cancer – a type seen in about 15 percent of cases. Due to the nature of her case, doctors recommended that Smith undergo chemotherapy, which she completed in November 2013.
“The waiting is the hardest part when you’re diagnosed, so having the Breast Center in the new cancer center makes for a more efficient, comprehensive and expedient process from diagnosis to treatment,” Smith said.

Less than a week passed between the time Amy felt the lump and the day she was admitted for surgery.

Due in part to early detection, accurate imaging and the quick, expert work of her caregivers, Smith celebrated her two-year anniversary of being cancer-free in May 2015.

“When you’re dealing with the possibility – or the reality – of breast cancer, there are so many components, from screenings and diagnosis to treatment and all the way through recovery,” said Amy Beaver, RN. “At the Breast Center, we’re committed to doing what’s best for each patient, and we’re with them every step of the way.”

“We want patients to have the peace of mind that comes from confidence in your medical team and having access to the most advanced imaging technology,” Bohan added. “That’s what it means to be a comprehensive breast center.”

The Breast Center is located on the third floor of the CAMC Cancer Center in Kanawha City at 3415 MacCorkle Ave., SE in Charleston. Office hours are Monday through Friday from 7 a.m. to 4:30 p.m. Walk-ins are welcome for mammograms and bone density screenings or you may schedule an appointment by calling (304) 388-9677.

For more information, call (304) 388-2861 or visit camc.org/breastcenter.

Genetic Risk Clinic

Led by Elizabeth S. Monast, MS, The Breast Center is the only center in the region to provide a Genetic Risk Clinic. The clinic offers breast cancer risk assessment and genetic counseling and testing for hereditary cancers.
A look at Breast Cancer Care at CAMC, 2012 data from the National Cancer Data Base

### Stage Distribution - Breast Cancer Diagnosed in 2012, My Facility vs. All CoC

<table>
<thead>
<tr>
<th>Stage</th>
<th>My Facility</th>
<th>All CoC</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>5.74% (n=14)</td>
<td>46.72% (n=114)</td>
</tr>
<tr>
<td>II</td>
<td>48.15% (n=114)</td>
<td>22.95% (n=58)</td>
</tr>
<tr>
<td>III</td>
<td>24.15% (n=58)</td>
<td>15.86% (n=42)</td>
</tr>
<tr>
<td>IV</td>
<td>9.43% (n=23)</td>
<td>7.65% (n=20)</td>
</tr>
<tr>
<td>NA</td>
<td>2.87% (n=7)</td>
<td>3.87% (n=10)</td>
</tr>
<tr>
<td>UNK</td>
<td>0.00% (n=0)</td>
<td>0.00% (n=0)</td>
</tr>
</tbody>
</table>

### In/Out Migration Breast Cancer, 2010 - 2012 - My Facility

<table>
<thead>
<tr>
<th>Year</th>
<th>Diagnosed Here and Treated Elsewhere</th>
<th>Diagnosed and Treated Here</th>
<th>Diagnosed Elsewhere and Treated Here</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.43% (n=1)</td>
<td>94.68% (n=199)</td>
<td>14.89% (n=35)</td>
</tr>
<tr>
<td>2011</td>
<td>0.4% (n=1)</td>
<td>80.87% (n=199)</td>
<td>10.03% (n=47)</td>
</tr>
<tr>
<td>2012</td>
<td>0% (n=0)</td>
<td>85.06% (n=209)</td>
<td>14.34% (n=35)</td>
</tr>
</tbody>
</table>
Days to First Treatment Quartiles Breast Cancer: Cases Diagnosed at My Facility or Elsewhere; Treated at My Facility, 2012

### Days to First Treatment Quartiles Breast Cancer: Cases Diagnosed and Treated at My Facility, 2012

<table>
<thead>
<tr>
<th>My Facility</th>
<th>0-15</th>
<th>16-28</th>
<th>29-42</th>
<th>&gt;=43</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>18.07% (n=36)</td>
<td>45.75% (n=76)</td>
<td>24.1% (n=40)</td>
<td>12.05% (n=20)</td>
</tr>
</tbody>
</table>

Percent for my facility represents what percent of our patients were treated within the number of days in this table. The "national" benchmarks for CoC-accredited programs are represented by the Quartiles represented in the column.
Zip Code Location of Radiation Delivery for Breast Cancer Heat Map, 2012

Legend
- Received Radiation Therapy
  - My Facility
  - 0% Elsewhere
  - >20% Elsewhere
  - >50% Elsewhere
  - More than 50% Elsewhere

<table>
<thead>
<tr>
<th>At My Facility</th>
<th>Elsewhere</th>
<th>Total</th>
<th>Average Distance for All Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients Radiated</td>
<td>95.54% (n=107)</td>
<td>1.79% (n=2)</td>
<td>112</td>
</tr>
</tbody>
</table>

* n/d = Number of cases in zip code that received radiation in my facility / Number of cases in zip code that received radiation

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The Rapid Quality Reporting System (RQRS) is a voluntary program of the National Cancer Data Base (NCDB) that allows facilities to review and track performance on a more concurrent basis. Charleston Area Medical Center (CAMC) chose to participate at the inception of RQRS because the Cancer Committee realized the potential value in being able to identify patients who may be nearing deadlines for evidence-based guidelines. The Cancer Registry submits data and monitors RQRS monthly to identify and alert providers to patients who are at risk for not receiving timely medical treatment.

Each of the current RQRS measure are displayed in graph format, comparing CAMC’s performance to West Virginia (WV) facilities, facilities in the Southeast Region and to all facilities who are accredited by the Commission on Cancer (CoC).

ACT is the NCDB’s designation for one of the colon quality measures. The definition states, “Adjuvant chemotherapy is considered or administered within 4 month (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer.”

With the exception of 2010, CAMC is exceeding performance over WV state, Southeast region and all CoC-accredited facilities. In 2010, CAMC remained on par with WV state, and exceeded the Southeast region and CoC-accredited facilities.

It is important to note that the volume of cases meeting this measure are, in order from 2008 to 2014, are 20, 27, 28, 21, 17, 18, and 21.
12RLN is the NCDB’s designation for lymph node removal for colon cancers. This measure is defined as, “At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer.”

This is a measure that CAMC continues to improve upon. The difficulty with this measure is multifactorial. Looking at the graph, CAMC has always led the state in performance on this measure. However, during 2009 through 2012 CAMC fell behind both the Southeast region and all other CoC-accredited facilities. Since 2013, CAMC has improved on this measure and exceeded performance in comparison to WV, the Southeast region and all other CoC-accredited facilities.

The denominators for the cases meeting this measure, in order from 2008 to 2014, are 65, 74, 63, 62, 66, 73 and 74.

BCS is the NCDB’s designation for radiation therapy in breast cancer. The definition states, “Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer.”

CAMC remains in pace with the state performance on this quality measure, with the exception of 2010 and 2013. Review of the data for this measure shows that CAMC had a few cases where the patients chose alternate forms of treatment, deviating from standard care. This measure will continue to be monitored for improvement.
The denominators for this measure are 55, 50, 48, 69, 69, and 59 in order from 2008 to 2013.

**BCS**

![BCS Graph](image)

HT Is the designation by the NCDB for the breast measure for hormone therapy. This measure is defined as, “Tamoxifen or third generation aromatase inhibitor is considered or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0, or stage IB-III hormone receptor positive breast cancer.

As noted in the graph for this breast cancer measure, CAMC has lead performance when compared to facilities in WV, the Southeastern United States and all CoC-accredited facilities in the nation. This result is an example of CAMC’s continued journey toward excellence in cancer treatment.

The denominators for the cases meeting this measure, in order from 2008 to 2013, are 93, 75, 83, 96, 119 and 95.

**HT**

![HT Graph](image)
MAC is the NCDB designation for chemotherapy in breast cancer. The definition states, “Combination chemotherapy is considered or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1cN0M0, or stage IB – III hormone receptor negative breast cancer.”

For this quality measure, CAMC has met or exceeded state, Southeastern region and all CoC-accredited facility performance with the exception to 2014. This is a multifactorial issue, including cases which treatment was delayed due to significant co-morbidities or complications that impacted performance rates.

It is interesting to note that CAMC has a small number of cases meeting the definition on this measure which may affect the percentages. The denominators are 21, 17, 24, 22, 20, 12, and 18 in order from 2008 through 2013.
A look at Colon Cancer Care at CAMC, 2012 Data from the National Cancer Data Base

Stage Distribution - Colon Cancer Diagnosed in 2012, My Facility vs. All CoC

In/Out Migration Colon Cancer, 2010 - 2012 - My Facility
Distance Traveled - Colon Cancer, 2012

Days to First Treatment 50th Percentile Colon Cancer: Cases Diagnosed and Treated at My Facility, 2012

Percent for my facility represents what percent of our patients were treated within the number of days in this table. The "national" benchmarks for CoC-accredited programs are represented by the 50th Percentile represented in the column.
Days to First Treatment 50th Percentile Colon Cancer: Cases Diagnosed at My Facility or Elsewhere; Treated at My Facility, 2012

<table>
<thead>
<tr>
<th>My Facility</th>
<th>0-6</th>
<th>&gt;7</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.24% (n=44)</td>
<td>51.76% (n=44)</td>
<td></td>
</tr>
</tbody>
</table>

Percent for my facility represents what percent of our patients were treated within the number of days in the table. The "national" benchmarks for CoC-accredited programs are represented by the 50th Percentile represented in the column.
A Look at Prostate Cancer Care at CAMC, 2012 data from the National Cancer Database

Stage Distribution - Prostate Cancer Diagnosed in 2012
My Facility vs. All CoC

<table>
<thead>
<tr>
<th></th>
<th>My Facility</th>
<th>All CoC</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>37.14% (n=65)</td>
<td>22.43% (n=24143)</td>
</tr>
<tr>
<td>II</td>
<td>36% (n=63)</td>
<td>56.01% (n=60288)</td>
</tr>
<tr>
<td>III</td>
<td>0.71% (n=17)</td>
<td>10.86% (n=11880)</td>
</tr>
<tr>
<td>IV</td>
<td>6.88% (n=12)</td>
<td>7.78% (n=8374)</td>
</tr>
<tr>
<td>NA</td>
<td>0% (n=0)</td>
<td>0.05% (n=56)</td>
</tr>
<tr>
<td>UNK</td>
<td>10.26% (n=18)</td>
<td>2.97% (n=3092)</td>
</tr>
</tbody>
</table>

In/Out Migration Prostate Cancer, 2010 - 2012 - My Facility

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosed Here and Treated Elsewhere</td>
<td>0% (n=0)</td>
<td>0% (n=0)</td>
<td>0.57% (n=1)</td>
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<tr>
<td>Diagnosed and Treated Here</td>
<td>87.36% (n=150)</td>
<td>86.5% (n=141)</td>
<td>85.71% (n=150)</td>
</tr>
<tr>
<td>Diagnosed Elsewhere and Treated Here</td>
<td>12.84% (n=23)</td>
<td>13.5% (n=22)</td>
<td>13.71% (n=24)</td>
</tr>
</tbody>
</table>
Days to First Treatment Quartiles Prostate Cancer: Cases Diagnosed and Treated at My Facility, 2012

Percent for my facility represents what percent of our patients were treated within the number of days in this table. The "national" benchmarks for CoC-accredited programs are represented by the Quartiles represented in the column.

Days to First Treatment Quartiles Prostate Cancer: Cases Diagnosed at My Facility or Elsewhere; Treated at My Facility, 2012

Percent for my facility represents what percent of our patients were treated within the number of days in this table. The "national" benchmarks for CoC-accredited programs are represented by the Quartiles represented in the column.
Oncologic Surgery

Charleston Area Medical Center is fortunate to have a very experienced and well-trained group of surgeons that can effectively treat the cancer patients of the region. The section of oncologic surgery has advanced steadily over the years, supported by a long history of cutting-edge approaches to the treatment of solid tumors.

Every week our surgeons treat patients with tumors of the breast, thyroid, colon, rectum, pancreas, liver, skin (including melanoma), esophagus, stomach, lung and many others.

Colorectal surgeons, James Lohan, MD and Benjamin Dyer, MD are using the advanced technology of robotic surgery to aid in the surgical resection of colon and rectal tumors.

Robotic surgery is also being utilized for esophageal cancer by Ed Tiley, MD, John Deel, MD, and Nathan Kister, MD. Drs. Deel and Kister also lead the way in the surgical management of lung cancers, with Dr. Kister bringing his experience of minimally invasive techniques known as video-assisted thoracoscopic surgery (VATS).

Todd Witsberger, MD and Stacey Copeland, MD are providing exceptional surgical results for patients with breast cancer. In the event that a mastectomy is determined to be the best treatment over a lumpectomy, the assistance of the plastic surgery department enables patients to receive immediate or delayed breast reconstruction.

A large number of patients have benefited from the surgical skill of Bryan Richmond, MD, whose vast experience involves endocrine surgery, particularly thyroid and parathyroid surgery.

The expertise in the areas of hepato-biliary surgery has been enhanced with the recruitment of Michael Elmore, MD, a surgical oncologist and Jesse Clanton, MD, a hepatobiliary surgeon, who have rapidly taken charge of patients with liver, pancreas and biliary tumors. Advanced techniques, including laparoscopy and radiofrequency ablation, can be utilized in many of these patients, allowing fewer complications and quicker recovery.

A unique feature of the surgeons at CAMC is the collaborative effort put forth to ensure that the best care is provided for each patient. It is not unusual to have surgeons from different specialties or expertise to assist each other on some of the more complicated procedures when a multidisciplinary approach is needed. This teamwork approach assures the patient of better recovery and outcomes.

It’s hard to summarize the breadth of expertise that is offered in the department of surgery, but it is safe to say that giving your family member the best chance of beating cancer is the ultimate goal.
RESEARCH AND OUTCOMES
Center for Cancer Research

CAMC Health Education & Research Institute’s Center for Cancer Research continues to fulfill its purpose of providing access to the most current clinical trials, diagnostics and treatments to the people of West Virginia. We participate in the National Clinical Trials Network (NCTN), accessing trials from across the country for numerous disease processes. In the last year we have continued to provide access to national state of the art clinical trials for our patients. We continue to be competitive with many larger university based groups by offering the same treatment options for our patients locally.

Looking forward we will continue to be involved in genomic based cancer diagnostics and treatments. We are working with our physicians now to expand our coverage to include gynecologic and certain endocrine malignancies. We work with the Institutes’ Health services and Outcomes Research section supporting CAMC’s mission to provide the best health care to every patient every day.

The West Virginia Cancer Genomics Network is in its third year, lead locally by Dr. Todd Kuenstner CAMC Chief pathologist and coordinated by Angela Henderson RN, BSN, collecting tumor samples for genomic sequencing. Combined with clinical data, the genomic analysis may lead to technology to further tailor cancer treatment to the individual patients. We are participating in the NCTN project MATCH: Molecular Analysis for Therapy Choice A study for patients with solid tumors and lymphomas that have progressed after initial treatment, the study will assign, or “match,” a patient to a specific cancer treatment based on whether certain genetic changes are found in their tumor. This study may include up to 20 different treatments based on genetic mutations found. The nationwide target accrual for MATCH is 3000 patients.

Physician engagement is crucial to a successful research program, Dr. Steven Jubelirer continues to be our Principal Investigator for our National Cancer Institute Cooperative studies, and Dr. Arun Nagarajan is our principal investigator for our industry and NCI/Industry hybrid studies. Also supporting research are Medical Oncologists, Dr. James Frame, Dr. Ahmed Khalid, Dr. Terrence Rhodes and Urologic Oncologist Dr. Sam Deem. We welcome two new physicians to the cancer center, Dr. Ali Sayed who came from University of Virginia and Dr. Moussa Sissoko from Boston University and are assisting them with their credentialing for research participation.

CHERI Center for Cancer Research, and the Office of Research and Grants are working with Princeton Community Hospital to establish a research alliance facilitating PCH participation in NCTN protocols. This will allow patients in Southern West Virginia to have easier access to trials, without having to come to Charleston or travel out of state.

The Center for Cancer Research has relocated within the new CAMC Cancer Center. We are very happy to be in our new space and look forward to working in such an inspiring environment. Our new facility has a fully equipped exam room for patient convenience, freeing up much needed clinic space for the CAMC Cancer Center. Our credentialed staff will be able to perform some research required assessments, obtain and process patient specimens for correlative studies, perform Quality of life and other required metrics.
We have a designated Research Pharmacy with secured storage for our investigational agents. We anticipate the new space to allow us to expand our services to our patients and offer a wider array of services to our pharmaceutical sponsors.

As part of our performance Improvement we have worked to increase awareness of our clinical trial availability, the Center for Cancer Research now has a publically available website with a current listing of all of our accruing trials with links to the NCI website for more information. We are nearing initiation of a local project to assess physician and staff awareness and perceived barriers to clinical trial participation. An exciting study that may be taken to the state level in the future.

Staff from Cancer Research actively participates in the weekly tumor board conference and the CAMC Breast Center Leadership committees. Our regulatory department keeps up with the ever changing NCI Central IRB rules and language requirements also working with the local Institutional Review Board to streamline the process of protocol submission.

In August, The Center for Cancer Research sponsored a Research Participant celebration where all participants in clinical trials were invited to a reception Emceed by Dr. Steven Jubelirer, recognition was given for their participation, educational presentations were given by Dr. James Frame, Dr. Lloyd Farinash and a heartfelt presentation was given by Beth Minear about her personal journey. It was an inspiring evening for all who attended.
Scholarly activities in Hematology/Oncology for 2015 include investigator initiated projects and presentations.

Publications & Presentations

Dr Steven Jubelirer
Thrombotic thrombocytopenic purpura (TTP) following coronary artery bypass: case series and review of the literature.
Published in WV Medical Journal 2015 Jan-Feb;111 (1):10-4

Geographic access and age-related variation in chemotherapy use in elderly with metastatic breast cancer.
Published in Breast Cancer Research and Treatment 2015 Jan;149(1): 199-209

Dr Arun Nagarajan
Accepted for Poster Presentation at San Antonio Breast Cancer Symposium 2015

A prospective study of patterns of chemotherapy (chemo), G-CSF use, and burden of G-CSF injections in early-stage breast cancer (ESBC)
Rich Barron, *Xiaoyan (Shawn) Li, Yanli Li, 1David Chandler, 1Hairong Xu, 1Phuong Khanh Morrow, 1Zandra Klippel, James Robinson, 4Arun Nagarajan, 1Maureen Reiner, 1John H. Page,

American Society of Hematology: Abstract #81401
A 10 Year Retrospective Analysis of Carotid, Coronary and Lower Limb Arterial Stenosis in Patients with Polycythemia Vera or Essential Thrombocytemia American Society of Hematology: Abstract #81401
Sandhya Talakokkla, MD1*, Renuka Mahatra, BS2*, Arun Nagarajan, MD2, Rahul Lanka, B.S2*, Aravinda Nanjundappa, MD3* and Stephanie Thompson, PhD4*

Secondary Malignancies in Mantle Cell Lymphoma American Society of Hematology: Abstract #78884
Sandhya Talakokkla, MD1*, Renuka Mahatara, BS2*, Christine A Welch, MS3* and Arun Nagarajan, MD2

Dr James Frame
FRAME JN. Endocrine Therapy for Breast Cancer in 2015. 2015 2nd Annual Breast Health Conference. Sponsored by CAMC Health Education and Research Institute, Charleston Area Medical Center and the Charleston Division of West Virginia University School of Medicine. Charleston, WV (invited presentation, February 27, 2015).

Dr Sam Deem
Primary Melanoma of the Urinary Tract Published in Journal American Osteopathic Assoc. 2015;115 (9):579

**Insignificance of Perirenal Fat Invasion in Small Renal Masses**
Nathan Hale DO, Clayton Davis BS, Sharon Hill MS, Christine Welch MS, Samuel Deem DO

**Objective:** To evaluate oncologic outcomes in clinical T1a tumors which remain pathological T1a compared to tumors which were upstaged to pathologic T3a due to perirenal fat invasion.

**Methods:** A retrospective database was created of all patients with solitary clinical T1a renal masses who underwent surgical intervention for renal cell carcinoma from 2000 to 2012 at a single institution. Patients with pathologic T1a renal cell carcinoma were compared to those upstaged to T3a for differences in overall mortality and disease-free survival using Kaplan-Meier and Cox Proportional Hazards models.

**Results:** Of the 218 patients with cT1a, 24 (11%) were upstaged to pathologic T3a. Kaplan-Meier survival estimates revealed there to be no statistical differences in overall mortality. Multivariate regression analysis revealed that only age and Charlson index score were predictors of overall survival. Hazard ratios for ≥65 years of age, clear cell histology, and Charlson index score per point were 2.2 times (95% CI:1.38-3.57, p <.001), 1.68 times (95% CI:1.03-2.77, p =.04), and 1.38 (95% CI:1.22-1.56, p <.0001), respectively. Upstaging a cT1a renal mass to pT3a due to perirenal fat invasion was not a significant predictor of overall survival.

**Conclusions:** Clinically diagnosed T1a tumors which are upstaged to pathologic T3a secondary to perirenal fat invasion have similar oncologic outcomes when compared to clinically diagnosed T1a tumors which remain pathologic T1a. Patients with clinical T1a tumors which are upstaged to pathologic T3a due to perirenal fat invasion should be counseled that other health status considerations have a greater effect on overall survival than upstaging.
Does Peri-Operative Mannitol use alter renal function after robotic-assisted laparoscopic partial nephrectomy (RALPN)
Kellen B Choi, DO, Sharon Hill, MPH, Samuel Deem, DO Charleston Area Medical Center, Charleston, West Virginia

Introduction:
Traditionally, mannitol has been used to preserve renal function by improving kidney circulation and decreasing reperfusion injury for partial nephrectomies. However, there is limited evidence to indicate that mannitol helps with kidney function post-operatively with minimally-invasive partial nephrectomies. Robotic-assisted laparoscopic partial nephrectomy (RALPN) has been shown to decrease warm ischemia time which may minimize any benefit that mannitol could provide. To date, no prospective, randomized trial has been performed to investigate mannitol's benefit in robotic procedures. However, it is still used frequently in these procedures. The purpose of this study is to determine if intra-operative mannitol use during RALPN provides any benefit on post-operative renal functional outcomes.

Materials and Methods:
We conducted a randomized, double blinded, single surgeon, prospective pilot study. 35 patients, who met inclusion criteria, were randomized into two groups, those who received mannitol intravenously and those who received normal saline. Creatinine (sCr), and estimated glomerular filtration rate (eGFR) were obtained from each of them 14 days prior to the surgery, and post operatively at 1 week and 4 weeks.

Results:
18 patients were in mannitol group and 17 saline group after randomization. No differences were found between the two groups with respect to age, gender or co-morbid conditions. More importantly, there was no statistically significant difference between the two groups, in terms of both change in sCr and eGFR pre-op compared to follow up in 30 days after the surgery.

Conclusion:
Using mannitol does not seem to improve renal functions after RALPN in our pilot study.
Positive Surgical Margin after Radical Prostatectomy: Effect on Oncologic Outcomes
Kellen B Choi, DO, Elizabeth L Price, DO, Chelsea Casey, Sharon, Hill, MPH, Asmita Modak, MS, Samuel Deem, DO Charleston Area Medical Center, Charleston, West Virginia

Introduction: When a positive surgical margin (PSM) occurs after radical prostatectomy, urologists are faced with the dilemma of whether to immediately treat with adjuvant radiation or to observe. Three randomized clinical trials have shown a benefit of immediate radiation over no treatment in terms of biochemical progression free survival, metastasis free survival and 10 year cancer free survival. The purpose of this study is to gain an understanding of the effect a positive surgical margin after prostatectomy has on recurrence and survival.

Materials and Methods: We reviewed our local tumor registry and identified all patients that had undergone a radical prostatectomy for prostate cancer from 2000-2010. We investigated margin status after radical prostatectomy and time to BCR, if the patient had subsequent BCR.

Results: A total of 468 patients underwent radical prostatectomy and had records available for review. 56 subjects were found to have a PSM (12%). We found that with a mean of 61 months follow-up, 38 (75%) of the 51 patients who did not receive immediate radiation had undetectable PSA levels. 13 (27%) have had biochemical recurrence (PSA > 0.2), and of those, 6 have undergone successful salvage external radiation therapy (XRT). All 13 patients are still alive and well.

Conclusion: Positive surgical margins at the time of radical prostatectomy still pose the question of whether to radiate or not. In our study, 75% of men have been spared post-prostatectomy radiation and continue to remain cancer free at five years follow-up despite a PSM. All patients who had a BCR and have been salvaged with XRT continue to do well. Salvage radiation at the time of biochemical recurrence may spare some men the side effects of immediate radiation. Longer follow-up is necessary to support these conclusions.
Cervical Cancer Screening

“Cervical cancer is highly preventable because of screening tests and vaccine,” said DHHR Cabinet Secretary Karen L. Bowling. “Today, we joined our partners from both the private and public sector to highlight this serious disease and the interventions available to help protect the health and well-being of the women of West Virginia.”

“It’s important to remember that half of all cervical cancers occur in women rarely or never screened for cancer, and another 10%–20% of cancers develop among women who were screened, but did not receive adequate follow-up care,” said Dr. Rahul Gupta, State Health Officer and Commissioner for the Bureau for Public Health.

There were 107 women diagnosed with cervical cancer in West Virginia last year and data indicate that approximately 100 more women will be diagnosed with cervical cancer this year.

“Cervical cancer is preventable with Pap screening tests and vaccine to combat human papillomavirus (HPV), which is the main cause of cervical cancer,” said Stephen H. Bush, MD, FACOG, Associate Professor and Chairperson of the West Virginia University Charleston Division Department of Obstetrics and Gynecology. “Cervical cancer deaths decreased 70% between 1955 and 1992, and continue to decline each year due to increasing use of the Pap test. The HPV vaccine is nearly 100% effective in preventing the most common types of HPV-related cervical cancer.”

The Pap test can detect changes in the cervix before cancer develops and it can detect cancer in its earliest stages when more treatment options are available. For males and females under the age of 26, HPV vaccination is available and helps to prevent cervical cancer in women.

The West Virginia Breast and Cervical Cancer Screening Program (WVBCCSP) provides free or low-cost Pap tests for low-income, uninsured or underinsured women.
Prevention and screening
Kristy Fidler

West Virginia continues to be challenged with many issues that raise the risk of developing cancer. Examples include ranking among the highest in the nation for risk factors such as tobacco use and obesity. Recognizing these challenges in terms of prevention, CAMC works to create awareness about many facets of prevention including healthy eating, exercise and the dangers of using tobacco.

CAMC takes a proactive approach to prevention by providing annual events such as HealthFest and Teddy Bear Fair. Good health can begin at any age and these events strive to address the needs from our youngest to oldest citizens. HealthFest is open to all ages and continues to reach nearly 1,000 participants each year and offers information on prevention and screening for various cancers such as breast, colon and skin. Booths of professionals offer information on healthy eating and the benefits of exercise.

Additionally, during HealthFest at the Charleston Civic Center, various cancer screening and prevention topics are offered including a skin analysis booth, breast health and tobacco cessation. A notable feature for 2015 was the “Strollin’ Colon.” This inflatable colon model gives participants a large scale look at colon cancer and the importance of colon health screenings.

Colon health was also a the focus of the CAMC Foundation’s most successful “Run for Your Life” 5 mile run and 2.5 mile walk Saturday, June 20. The event served not only as a fundraiser for our Colorectal Screening Program but also as a prevention, screening and education opportunity.

Teddy Bear Fair hosted on the first Saturday in October works to educate children and families on a variety of health topics. Booths included Keys for HealthyKids, lung and dental health as well as promoting physical activity opportunities such as Zumba and our local YMCA.

CAMC also lends itself to promoting disease specific prevention and screening opportunities. For example, The American Cancer Society recommends yearly mammograms starting at age 40 and continuing for as long as a woman is in good health. Clinical breast exam (CBE) about every three years for women in their 20s and 30s and every year for women 40 and
over is also recommended. They also promote that women should know how their breasts normally look and feel and report any breast changes to a health care provider right away. For this reason, the staff and physicians of the CAMC Breast Center continue to strive to bring awareness to breast cancer prevention and screening to the Charleston area through education of both professionals and the public.

In 2015, health care professionals were invited to attend the annual Breast Health conference. The Breast Center and imaging staff are working hard to make the community at large aware of breast health by participating in events such “Holiday in Pink,” the Susan G. Komen walk and run, and speaking to groups such as local ladies Veterans of Foreign Wars auxiliaries, churches and multiple breast cancer awareness month events.

Each October is breast cancer awareness month. Once again various departments at CAMC decorated real and artificial pumpkins and placed them in a “Pink Pumpkin Patch” in the lobby of the new CAMC Cancer Center. The pumpkins were judged based on people’s choice and best breast cancer awareness message.

CAMC will continue to be at the forefront in the fight against cancer and the commitment to educating the community on prevention and screening will likely be a primary battle strategy which our organization takes seriously.
Children’s Cancer Center

The Children’s Cancer Center provides infusions of chemotherapy and other drugs to hematology/oncology patients, as well infusion services for patients with other illnesses. These include blood or genetic disorders, gastrointestinal, immune and endocrine disorders.

Typically visits average between 100 and 120 per month.

Services provided by this center accommodate those pediatric patients receiving care in which inpatient hospitalization is not required. Care is based on a family-centered approach.

The Children’s Cancer Center is equipped with comfortable recliners and offers games, televisions, DVDs and a play room, as well as snacks and drinks. All of the patient rooms are private which allows for added safety and comfort for those who are sick or are immune compromised.

Infusion Services at the Children’s Cancer Center include:
- IV infusions of chemotherapy
- Blood product transfusions
- Administration of immune disorder solutions
- Enzyme replacement therapy
- IV antibiotic therapy
- Serial laboratory work
- Intramuscular (IM) injections
- Management of centrally placed lines/ports

Health care professionals joined oncology patients and families as West Virginia Governor Earl Ray Tomblin issued a proclamation recognizing September as Childhood Cancer Awareness Month. The group wore yellow and released balloons as part of the ceremony.

In 2015, the Children’s Infusion Center was renovated. A patient room was added increasing the number to five. A playroom was also added.
CAMC Hemophilia Treatment Center

By: Donna Arden

The CAMC Hemophilia Treatment Center (HTC) is a comprehensive program funded in part through two federal grants for the diagnosis, treatment and prevention of bleeding. People throughout the life span are seen who have a congenital bleeding disorder such as hemophilia, von Willebrand disease and other bleeding disorders. Most recently we have started treating congenital clotting disorders such as factor V leiden and MFTHR. Dr. Steven Jubelirer serves as the adult hematologist and medical director. Dr. Chibuzo O’Suoji is the pediatric hematologist and pediatric director.

The federally funded Hemophilia Treatment Centers were originally a pilot program funded in part through the Centers for Disease Control and prevention and the Maternal and Child Health Bureau (MCHB) for the provision of comprehensive care of a chronic disorder. This program provided improvements in the quality of care, reduced mortality, and a reduction in the cost of care. CAMC is part of the MidAtlantic/ Region 3 hemophilia centers.

The comprehensive team includes an adult and pediatric hematologist, nurse, social worker and physical therapist. Collaboration between providers and the patient/family provides education of bleeding disorders, home infusion teaching and support. This collaboration begins at birth or with a new diagnosis of a bleeding or clotting disorder. Monthly clinics are held at CAMC Memorial Hospital with three clinics in Teays Valley annually.

The HTC offers a 340B factor program to eligible patients seen at the center. This program distributes required factor products or medications that patients need for the treatment of bleeding. One benefit of the 340B program is the revenue goes directly to the HTC to provide ongoing services for patients.

Research is another important part of the HTC. Hemophilia care has greatly improved over time, in part of the continuing research. The HTC in conjunction with the Centers for Disease Control and Prevention, Mayo Clinic, and the Children’s Hospital of Philadelphia offers 4 projects.

Genetic testing, education and outreach to potential family members who may have a bleeding disorder are focuses of the HTC. The genetic testing is done free of charge for patients with hemophilia.

A school education program is provided for schools, day care providers and preschool staff. The RN goes into the schools and provides education and written materials. This helps to ensure that the child will have a sage and successful school year along with decreasing the staff’s anxiety.

An annual camp (Hemovon) is provided for patients aged 7 to 16 free of charge. Both CAMC and WVU support this project.
Radiology

The Department of Radiology provides diagnostic and interventional imaging services for the clinical and research programs at CAMC. Imaging Services are provided at seven convenient locations; Memorial, General, Women & Children’s and Teays Valley Hospitals and outpatient imaging centers in Kanawha City and Southridge in addition to the Breast Center. All locations are staffed with registered and licensed technologists and nurses.

Associated Radiologist, Inc., comprised of 17 full-time board certified radiologists with expertise in nearly every specialty and diagnostic modality, staffs the Department of Radiology. Faculty members have received training in outstanding medical centers throughout the United States, many completing postgraduate work and fellowship training. The department is composed of highly dedicated physicians, nurses, technologists and staff who specialize in cancer screening, diagnosis, intervention and surveillance. The radiologists use recently upgraded voice recognition software with self-editing for transcription which allows for quicker report turn-around times.

The department of diagnostic imaging offers a full complement of screening, diagnostic and non-vascular interventional radiological technologies. Modalities offered include X-ray, fluoroscopy, ultrasound, fetal ultrasound, digital mammography, bone density (DEXA), computed tomography (CT), magnetic resonance imaging (MRI) including diagnostic and interventional breast care and MR spectroscopy, nuclear imaging, positron emission tomography (PET) and image-guided biopsy services.

Some of our highlights are our state-of-the-art equipment. We have three full-field (1.5 tesla) MRI scanners and one three-tesla MRI scanner. One of the 1.5 and the 3T are large diameter bore for claustrophobic and larger patient accommodation. CAMC’s newest MRI scanner, the Philips Ingenia 3T, provides unique capabilities in many areas of study, specifically neurological imaging. One feature of this technology is the NeuroQuant®, which is a special analysis that is added to a brain MRI. The NeuroQuant® is a tool that screens for Alzheimer’s disease and other neurological disorders. It automatically measures the size of the structures in the brain and compares scans against a national database, the Alzheimer’s disease Neuroimaging Initiative. Functional MRI (fMRI) is another capability of the 3T MRI. The fMRI examines the anatomy of the brain, helps to determine critical functions of the parts of the brain (brain mapping) and helps neurosurgeons plan for procedures. CAMC has added multiple ultrasound units with the latest technology over the last three years to increase the quality of images CAMC has upgraded its PET/CT imaging services with a new scanner, which includes a fixed 128 slice CT. The GE Discovery 610 with Q.Clear technology. CAMC is now able to perform more efficient and detailed scans with low-dose radiation capability. This technology offers smaller lesion detection with two times the image quality and PET quantitation accuracy. CAMC is the only hospital in the area with this technology. In 2015, CAMC Imaging Center at Southridge added a 128 slice low dose CT scanner. CAMC has 9 CT scanners used in Imaging Services; two 256-slice CT scanners, four 128-slice scanners, one 64-slice CT scanner and two
16-slice CT scanners. CAMC has recently added radiation dose tracking software which allows for the CT protocols to be inputted into the software server and analyzed. Due to the methodology used to calculate dose that enables users to change parameters of the scan protocol and estimate the dose, all of which better serves our patients and allows physicians to make informed decisions regarding their patients’ care.

In The Breast Center, CAMC offers all digital mammography and the MammoPad for softer imaging. All images are acquired in digital format, interpreted on electronic workstations, filed and stored electronically, and distributed to clinicians by an in-house network and the worldwide web. The Breast Center works with the Cancer program in a multidisciplinary approach to treating breast disease and patient care is coordinated with a patient navigator. Mammography is performed at the Breast Center and both outpatient imaging locations. In 2015 The Breast Center added Breast Tomosynthesis commonly referred to as 3D mammography. This technology provides earlier detection, better visualization and fewer callbacks. 3D Mammography can be used as a screening tool in conjunction with a traditional (2-D) digital mammogram or may be used by itself for a diagnostic mammogram. It is particularly helpful for women with dense breast tissue, family history of breast cancer and those who are high-risk for breast cancer. The Breast Center is a Center of Excellence as awarded by the American College of Surgeons.

CAMC is privileged to have our own hospital based Nuclear Pharmacy. This allows for CAMC to maintain USP 797 certification for compounding and supply of Radiopharmaceuticals to CAMC Health System and the local Charleston Area Nuclear Medicine providers. The Nuclear Pharmacy is operated by one of the few Board Certified Nuclear Pharmacists in the state. During national drug shortages over the last few years, CAMC has maintained production to allow for Nuclear Medicine procedures for our patients and community providers.

CAMC Imaging Services uses PACS or Picture Archiving, Communication and Storage system which eliminates standard X-ray film. This technology allows for faster interpretations and provides improved accuracy, efficiency and satisfaction by patients and clinicians. We have a shared VPN with several facilities such as Greenbrier Valley Medical Center, Logan Regional Medical Center, Raleigh General, Summersville Regional Medical Center, Thomas Health System and WVU Hospitals so we can share images with clinicians at these locations to assist in the transition of care for patients transferring out of or in to CAMC. In 2014 CAMC made it possible for patients to view and download their imaging reports within 36 hours of their exam completion thru a patient portal once provisioned through the hospital.
American Cancer Society and Charleston Area Medical Center

Mary Lough, American Cancer Society

“80% by 2018” is a National Colorectal Cancer Roundtable initiative in which dozens of organizations have committed to eliminating colorectal cancer as a major public health problem and are working toward the shared goal of 80% of adults aged 50 and older being regularly screened for colorectal cancer by 2018. The National Colorectal Cancer Roundtable, an organization co-founded by the American Cancer Society and the Centers for Disease Control and Prevention, is rallying organizations to embrace this shared goal. CAMC signed the pledge in March of 2014 which was presented at the National Kickoff of the 80% by 2018 showing their commitment to join in on the this initiative and to lead the way in the fight against colon cancer.

Why is CAMC focusing on colorectal cancer?

CAMC understands that colorectal cancer is a major public health problem. Colorectal cancer is the third leading cause of cancer death in both men and women in the U.S. and a cause of considerable suffering among more than 140,000 adults diagnosed with colorectal cancer each year. The good news is that when adults get screened for colorectal cancer, it can be detected early at a stage when treatment is most likely to be successful, and in some cases, it can be prevented through the detection and removal of precancerous polyps. About 1 in 3 adults between 50 and 75 years old – about 23 million people – are not getting tested as recommended.

What will an 80% screening rate achieve?

The ACS, National Colorectal Cancer Roundtable, CAMC and other organizations stand united in the belief that we can eliminate colorectal cancer as a major public health problem. We can save thousands of lives by increasing screening rates to 80%. We know what we need to do to get more people screened for colorectal cancer, prevent more cancers and save lives, and we share a commitment to eliminating disparities in access to care. CAMC will work to empower communities, patients, health care providers, community health centers, and health systems to close the screening gap.

The ACS and CAMC Cancer Center share a commitment to improve the quality of cancer care, increase community awareness of the importance of cancer prevention and early detection, and provide supportive services and information to cancer patients and their caregivers. By providing referrals to the ACS Patient Resource Center to help patients and caregivers find the information, resources and support they need to have a good quality of life while going through their treatments. Programs such as:
• Look Good…Feel Better - The ACS and CAMC Cancer Center share a commitment to improve the quality of cancer care, increase community awareness of the importance of cancer prevention and early detection, and provide supportive services and information to cancer patients and their caregivers. Patients who have participated in Look Good Feel Better® call it an emotional lifesaver.

• The ACS Cancer Resource Center located within the CAMC Cancer Center supports the Society with volunteers providing:

  Information: to support better decisions by making available high-quality, timely, understandable information, especially to newly diagnosed cancer patients and their caregivers; and

  Quality of Life: to improve quality of life of cancer patients, caregivers and survivors by assisting primarily with service referral, community mobilization, collaboration, advocacy, and where appropriate directly providing services.

• The American Cancer Society is available 24 Hours a Day, 7 Days a Week at 1-800-227-2345 or cancer.org.

• Road To Recovery - The ACS Road To Recovery program is a curbside-to-curbside transportation service that provides free rides to cancer patients to and from their cancer-related treatments. Trained volunteer drivers donate their time and the use of their personal vehicles to help patients get to the treatments they need. The program is offered to people with cancer who have no means of transportation and/or who are unable to drive themselves. Access to transportation is a major factor in cancer treatment, and this ACS service offers assistance to people who otherwise might not be able to follow their treatment plan as prescribed by their health care team. Join the ACS and volunteer to drive patients to their treatments. Call 1-800-227-2345 or visit cancer.org/Volunteer to see how you can get involved.

• The Personal Health Manager kit provides cancer patients in active treatment and their caregivers with a valuable tool to help manage and organize the multitude of information they receive from various sources related to their diagnosis and treatment.
Palliative Care
Deborah J Cotes, DO Medical Director, Palliative Care Services

Palliative care is an inpatient service at CAMC that helps cancer patients and their families cope with the multiple dimensions of their disease. Attention focuses on quality of life and relief from pain and symptoms that can interfere with daily life. Assistance is also provided with goal clarification, advance care planning and discharge options. As part of the cancer team, palliative care collaborates with the oncologists, supporting curative treatment or helping with options when cure no longer is the goal. Psychosocial, emotional and spiritual needs are addressed through family meetings with patients and their loved ones. Hospice referrals can be made if appropriate. Our team consists of a social worker, pharmacist, physicians and nurse practitioners. We are available week days from 8 a.m. to 5 p.m. for inpatient consultations.