Patient-Centered Care:
Before Diagnosis - After Discharge

2012 CAMC Cancer Services Report
Cancer committee  
Prem Raja, MD, chairman

The Cancer committee is formed as a standing committee established by the medical staff at Charleston Area Medical Center (CAMC). The cancer committee is assigned responsibility at CAMC for a multidisciplinary cancer committee, cancer conferences, evaluation of quality outcomes and improvements, and a cancer registry. CAMC recognizes, supports, and evaluates the following five elements as keys to the success of CAMC’s cancer programs:

1. Clinical services provide state-of-the-art pretreatment evaluations, staging, treatment, and clinical follow-up for patients with cancer seen at the program for primary, secondary, tertiary, or end-of-life care.

2. The cancer committee leads the program through setting goals, monitoring program activity, and evaluating patient outcomes and improving care. The 2012 cancer committee goals are discussed in detail below.

3. Cancer conferences provide a forum for patient consultation and contribute to physician education. CAMC offers cancer conferences that are weekly facility-wide, weekly breast, urology conference twice each month, and gastrointestinal every other month.

4. A quality improvement (QI) program is the mechanism for evaluating and improving patient outcomes. Quality Improvement goals for 2012 are discussed in detail below.

5. The tumor registry and database are the basis for monitoring the quality of care. The cancer committee monitors the accuracy and timeliness of data through representative sampling of the cases accessioned into the database, regular monitoring, reporting and auditing of the data in the Commission on Cancer’s (CoC) Rapid Quality Reporting System (RQRS) and the Cancer Program Practice Profile Reports (CP3R).

2012 Cancer Committee Goals

1. Clinical Goal
   a. Develop a group to work on improving colon cancer screening percentages in Kanawha County. This will be done by measuring the patients aged 50 and above who have had a screening colonoscopy within the past 10 years, improved over baseline. Barriers to care will have to be addressed (1) reminder to PCP’s to order screenings; (2) work with Health Right to provide access to the uninsured for colon screenings; (3) Use the nursing admission assessment to collect colon cancer screening information and alert the patient about potentially missed cancer screenings pertinent to the patient’s gender. This work is done in conjunction with the American Cancer Society in hopes of improving WV’s screening rate from 52% to the national screening rate for better.
2. Programmatic Goal
   a. Assessment of caregiver’s distress as a beginning to improving care to the caregiver. Develop an assessment tool to measure the quality of life and/or distress scale for caregivers for inpatients and outpatients. Potential barriers that will need to be addressed are access to caregivers at the time the assessment can be accomplished, the caregiver’s willingness to be assessed, and staffing sufficient to complete assessments. Screening will be completed for at least 100 caregivers in 2012 by Dec. 31.

3. Quality Improvement Goals:
   a. Patient Navigation
      i. Conduct a community needs assessment in 2012 to address health care disparities and barriers to care for cancer patients.
      ii. Identify resources with the patient navigators to address barriers that are provided either on site or by referral to community-based or national organizations.
      iii. Barriers to care are assessed and the navigation process is evaluated, documented, and the findings are reported to the cancer committee.
      iv. The patient navigation process is modified or enhanced to address additional barriers identified by the community needs assessment.
   b. Survivorship Planning
      i. Develop a process to disseminate a comprehensive cancer care summary and follow-up plan to cancer patients who are completing cancer treatment before 2015.
   c. Pathology
      i. In order to achieve commendation level of performance, 95% of cancer pathology reports will follow the synoptic format established by the College of American Pathologists (CAP) and the CAMC Cancer Committee.
      ii. In order to achieve commendation level of performance, 90% of cancer pathology reports include the required data elements as outlined in the CAP protocols.
   d. Cancer Registry
      i. The tumor registry will be supervised by a certified tumor registrar (CTR). CAMC will strive to have all data entry completed by a CTR before 2015.
      ii. The medical director for the tumor registry will perform quality reviews of certain abstracted data elements; at least 10% of all abstracted cases annually.
      iii. A case finding audit will be performed looking at 12% of the total cases accessioned the previous year to assure 100% of all cases were identified and abstracted in a timely manner.
      iv. Monitor and report on the percentage of patients with current follow-up information in the cancer registry database. At least 80% of all patients diagnosed with cancer at CAMC since Jan. 1, 1985 have current information
documented; and, at least 90% of all patients diagnosed within the past five years have current information documented.

v. In order to achieve commendation level of performance, monitor the call for data for timeliness and accuracy, ensuring that data is submitted the first time with no errors and that Call for Data deadlines is met.

vi. The medical director for the tumor registry will conduct audits of approximately 12% of all physicians’ staging for accuracy and completeness of AJCC Staging.

vii. The total number of accessioned cases across time will be monitored and evaluated looking at trends in cancer patient populations and for indications that case finding may be lacking.

viii. Extensive training for the non-credentialed registry staff will be continued in an effort to support achievement of a CTR credential for all members of the staff.

e. Palliative Care

i. Palliative care services are offered on site at CAMC and include the following:
   1. Team-based care planning that involves the patient and family
   2. Pain and non-pain symptom management
   3. Communication among patients, families and the provider team
   4. Continuity of care across a range of clinical settings and services
   5. Attention to spiritual comfort
   6. Psychosocial support for patients and families
   7. Bereavement support for families of patients who die and team members who provided care to the person who died
   8. Hospice care is presented as an option to patients and families when the prognosis is limited and death would not be surprising

f. Nursing Care (Inpatient and outpatient oncology)

i. In order to achieve commendation level of performance…
   1. 25% of chemotherapy-trained nurses employed at CAMC hold a current oncology nursing certification (OCN, AOCN, CPON, CPHON, AOCNS, AOCNP or CBCN)
   2. Nursing competency is reported to the cancer committee and documented in minutes

g. Clinical Trials/Research

i. In order to achieve commendation level of performance, CAMC will accrue at least 6% of cancer patients to cancer-related clinical trials. CAMC will begin working toward the 2015 goal of accruing 8% of cancer patients to cancer-related clinical trials.
h. Community Outreach

i. CAMC will offer multiple supportive service programs in 2012 including, but not limited to:

1. Adjustment to Illness Counseling
2. Advanced Care Planning
3. Caregiver and Family Counseling
5. Child Life Program
6. Community Resource Coordination
7. Facilitation of patient/family provider communication
8. Fertility counseling
9. Inpatient psychiatric consults
10. Lodging assistance
11. Mental health counseling
12. Outpatient psych care
13. Pain and Palliative care program
14. Patient Resource Center and Library
15. Pastoral Care
16. Psycho-education to enhance coping skills
17. Sexuality counseling
18. Support and Education Related to Parenting through Cancer
19. Wellness Program
20. Look Good… Feel Better
21. Reach to Recovery – Breast Cancer

ii. CAMC will offer support groups in 2012 including, but not limited to:

1. Loss/Bereavement Support Group
2. Collaborate with community agencies to offer breast cancer support groups
3. Prostate Cancer Hotline

iii. CAMC will offer screening and early detection programs in 2012 including, but not limited to:

1. Breast cancer screening at HealthFest 2012
2. Prostate cancer screening at HealthFest 2012
3. Skin cancer screening at HealthFest 2012
4. Breast Early Detection Outreach Program, Fall 2012
5. What Every Woman Over 40 Should Know, throughout 2012
iv. CAMC will offer healthy lifestyle and prevention programs in 2012 including, but not limited to:

1. Exercise
2. Nutritional dietary education
3. Skin cancer awareness
4. Smoking cessation
5. Weight control
6. Smoking cessation for pregnant women

i. Education
   i. The Cancer Liaison Physician will offer at least one education activity to cancer care providers involving the discussion of AJCC stage or other appropriate staging, which includes appropriate prognostic indicators and evidence-based national treatment guidelines in planning treatment for cancer patients.
   ii. At least one cancer-related educational activity, other than cancer conferences, to physicians, nurses and other allied health professionals.
   iii. In order to meet the commendation level of performance, each person working or volunteering in the cancer registry will participate in a cancer-related activity each year; and, each CTR credentialed member of the cancer registry staff will attend a national or regional cancer-related meeting once in every 3-year accreditation cycle.

Collaborative Practice
The Oncology Collaborative Practice Group is a subgroup of the Cancer Committee.

Keeping with ACS standards, this multidisciplinary team meets monthly to discuss identified concerns relating to the delivery of care to our inpatient and outpatient population of oncology patients.

The team consists of physicians, nurses, therapists, dieticians, pharmacists, case coordinator, pastoral care, administration, and we are proud to have the input from a patient representative.
This patient centered group is focused on continually improving their processes in order to deliver the best and safest care to our patients.

**Cancer center campaign reaches milestone**
It’s just dirt and concrete now, but where a baseball stadium once stood Charleston’s newest cancer center will be built.

During a fundraising celebration, more than 250 people wearing blue t-shirts stood where the 100,000-square-foot facility will be located on MacCorkle Avenue.

The campaign’s theme, “The Power of Many,” describes how many people within the Charleston community have come together to donate anywhere from $2 to $2 million each.

“It doesn’t make a difference what the size of the gift is it’s the importance of giving and knowing what cancer is all about and this is why the community should be involved in getting this cancer center to this site behind us,” said John Ziebold, Power of Many Campaign Chairman.

The number of patients coming to the David Lee Cancer Center increases every year. Dr. Steven Jubelirer said cancer will replace heart disease as the most common cause of death among adults.

“I don’t have to tell anybody in this room either the people who work here or the people who’ve been a patient here why we need a cancer center,” said Dr. Steven Jubelirer, an oncologist at the David Lee Cancer Center. “They just come to the cancer center and see the crowded rooms, waiting rooms, the waiting times and they’ll know why we need a new cancer center.”

CAMC CEO David Ramsey described the building that will consolidate many of the services such as chemotherapy and radiation treatment areas under one roof along with other things such as a chapel, a memory garden, a wig shop, a cafe and meeting rooms for patients, doctors and support groups.

“That’s the vision that we have for our cancer center,” said David Ramsey, CAMC CEO. “It’s one we’ve seen in other places. We’ve taken the good parts of other cancer centers, and we’re trying to make ours the best.”

Nancy Drescher, a lung cancer survivor can’t wait for the new center to be built.

“I’m going to have a top-notch cancer center here in Charleston, bravo folks,” Drescher said during the celebration.

Groundbreaking is expected in early 2013.

To learn more about the cancer center or to make a donation, visit camc.org/powerofmany.
Top: Architectural rendering of the new cancer center.
Left: Supporters of the campaign to build a new cancer center put on Power of Many T-shirts and created a human outline where the building will be built.
Lower left: Several “dancers” including CAMC employees and community volunteers performed a flash mob at the Charleston Town Center Mall to raise awareness about CAMC’s efforts to build a new cancer.
Bottom: The celebration featured a short program with patients, doctors and others involved with the campaign speaking.
The David Lee Cancer Center (DLCC) is CAMC’s center for adult medical oncology and hematology care. A Joint Commission accredited facility, DLCC 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.

Year to date DLCC has provided care for 37,759 beneficiary encounters including 25,973 patient visits and 11,786 chemotherapy-related infusions.

To address the growing access-to-care needs of our community, DLCC hematology oncology staff added a physician to the DLCC physician team in 2012 bringing the total number of staff physicians to eight. We are pleased to welcome West Virginia native, Dr. Terrance Rhodes, who completed his hematology oncology fellowship training at Duke University Medical Center, Durham, N.C. In addition, we also added another physician extender to compliment our physician assistant team: who have been instrumental in enhancing our inpatient care activities.

There will be an additional office location in Teays Valley, West Virginia in 2012. This office will offer the services of hematology and oncology specialty, with privileges at CAMC Teays Valley Hospital, and a complete chemo infusion area.

The majority of DLCC’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. DLCC is also privileged to have two board certified oncology pharmacists on staff to assist in meeting the demands of the cancer center.

Patient navigation is also a focus of DLCC. Currently there is one dedicated navigator for colorectal cancer patients. 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. There will be additional patient navigators in 2013.

DLCC has a dedicated financial navigator 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 new patient coordinator is a dedicated scheduler that provides a contact for patients and referring physicians.
The PET Therapy program at DLCC 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 DLCC patients and families. “Barney” and “Bailey”, 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 DLCC 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, DLCC 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. DLCC Physician Leaders continue to play an important role in IHCPI, 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. In 2011, DLCC physicians began participation in 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. This goal led to the DLCC being the only QOPI-certified oncology practice in the state of West Virginia.

In 2012, DLCC physician and nursing senior staff have been actively involved in leadership activities at the state and national level. These organizational activities include: West Virginia Oncology Society (president; board of directors; WV-Clinical Trials Network Working Group), American Society of Clinical Oncology (member, practice guideline implementation network; chairperson, risk evaluation mitigation strategies working group; member, clinical practice committee) and Oncology Nursing Society (member, presenter, spring WVOS meeting; local chapter president, president-elect, treasurer and secretary).

In addition to patient care and quality improvement activities, DLCC physicians participate in the education of internal medicine residents of the WVU School of Medicine Charleston-Division
at CAMC. 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 DLCC 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 over 25 years. In this issue, Dr. Dan Lucas summarizes our cancer center’s contributions to this ongoing effort over the past year. At DLCC, Dr. Steven Jubelirer has been the physician champion for this research effort in partnership with the CAMC Healthcare Education and Research Institute (CHERI) and fellow DLCC 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 DLCC 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, DLCC 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.

DLCC physicians and staff continue their collaborative participation in activities relating to the development of a new cancer center for our health care system. CAMC foundation began the “Power of Many” campaign to increase awareness of the project in 2012. The planning for the new center includes involvement from patients, families, and staff. The positive momentum demonstrated to date makes the dream of a new cancer center within reach. The new cancer center will include multidisciplinary care in one location. Including The Breast Center, David Lee Cancer Center, and Charleston Radiation Oncology. The center is proposed to open to patients in early 2015. This center will lead to enhanced multidisciplinary collegial opportunities in service to our patients and their families in a modern and nurturing environment of care.

Publications from Physicians of the David Lee Cancer Center (2010-2011):
Risk factors associated with time from diagnosis to treatment in WV females with invasive breast cancer from 2004-2009

By Steven Jubelirer, MD, Chris Welch, MS, Alana Hudson, PhD, MPH, and Andrea Labus, BA

Abstract
Initiating treatment in a timely manner for patients with invasive breast cancer is becoming increasingly important. In this study, we retrospectively reviewed factors associated with delayed treatment initiation after diagnosis in female patients with invasive breast cancer living in West Virginia between 2004 and 2009. Seven thousand nine hundred thirty nine patients from the West Virginia Cancer Registry were analyzed for various factors and their relationship to delay in treatment. To be included, female patients had to have lived in West Virginia with invasive breast cancer from Jan. 1, 2004 to Dec. 31, 2009. Patients were excluded for improper diagnosis and treatment dates, non-histologically confirmed diagnoses, or improper histology. After exclusion, 6,993 patients were left to be analyzed. Results found that the average time to treatment was 21.5 days and 74% of patients were treated within 30 days. Compared to 2004-2008, 32.66% of patients were found to have treatment delays greater than 30 days (p<0.0001). From 2004-2009, there has been a constant increase in delayed treatment, and was found to be significant in 2009 with delayed treatment time of 24.65 days (p<0.0002). If a patient was diagnosed in 2009 they were 1.5 times more likely to have treatment in more than 30 days. Whether or not lymph nodes were examined, was found significant for whether or not patients received treatment in no more than 30 days or greater than 30 days (p=0.03). If the patient had lymph nodes examined they were 1.2 times more likely to have treatment in more than 30 days. In West Virginia, the number of cases of breast cancer is constant, and the majority of patients are initially treated in 30 days after diagnosis. Increased delay in initiation of any treatment was found in patients with breast cancer in 2009 or patients that had lymph nodes examined. This is the first study done in West Virginia reviewing factors associated with delayed treatment of invasive breast cancer in females; therefore, more studies should be done to review other factors as well as mortality of invasive breast cancer patients.
Intracranial Hemorrhage in Patients on Warfarin: A review of the CAMC experience and outcomes
By Steven Jubelirer,

Abstract

Background: Warfarin is an oral vitamin K antagonist that is used worldwide as an anti-coagulant to prevent thromboembolisms in a variety of patient populations.

Methods/Design: a retrospective review of patients with Intracranial Hemorrhage (ICH) at Charleston Area Medical Center from 2006 to 2010.

Results: 177 patients with ICH were taking warfarin at admission. Males represented 57% of the 96% white population which had a mean age of 73 +/- 12. fibr (52%) was the most common indication for warfarin use followed by DVT or PE (16%), CAD 15% and prosthetic valves (10%). The mean INR at admission was 3.3 +/- 2.7 and when grouped 39% had an INR >3, while 25% were from 2 to 3 and 36% were <2. In 86% of the patients the INR was <2 or corrected with the use of treatments which included vitamin K (68%), fresh frozen plasma (69%), burr hole drainage (15%), and rfVlla (5%). Vitamin K was given IV 60.2% of the time, while the subQ route was used 19.5%, PO 13.8% and 6.5%. Poor initial outcomes were observed in the majority (72%) of the study population. Patients were discharged to facilities such as nursing home or hospice in 40% while 32.2% died in the hospital while within 30 days 45% were deceased. Univariate analysis revealed that use of NSAID’s (p<.001), Glasgow Coma Score (p<.0001), and those with follow-up INR that was not corrected or >2 (p=.01) were associated with death within 30 days. Logistic regression showed that those with an INR >2 or not corrected were 3.9 (95% Cl: 1.5-9.9) times more likely to have died in 30 days while those taking NSAID’s were 3.1 (95% Cl: 1.1-8.8) times more likely to be deceased in 30 days.

Conclusions: Mortality and morbidity from warfarin-associated ICH was high in this study. Factors associated with hospital death included Glasgow Coma Score on admission, and initial INR >2 or failure to correct INR to therapeutic or subtherapeutic levels. Implications for practice change include avoiding NSAID’s with warfarin and obtain and INR <2 quickly and then use of vitamin K via the IV route.


Hemophagocytic Lymphohistiocytosis (HLH) in a 25-year-old presenting with multisystem organ failure

Authors: Samantha Lane, DO PGY2, CAMC, Dept of Internal Medicine/Pediatrics; Christina Andrist MSIV, WVU School of Medicine; Arun Nagarajan, MD Assistant Professor, CAMC, Dept of Hematology Oncology, Charleston W.Va.

Abstract
Hemophagocytic lymphohistiocytosis (HLH) is a rare syndrome of extreme inflammation caused by pathologic activation of the immune system. Diagnosis of HLH is challenging as the clinical presentation is similar to common medical entities such as sepsis. When a source of the extreme inflammation is not found, HLH should be considered in the differential diagnosis. In HLH, inflammatory markers such as soluble CD25 and ferritin levels are elevated.1 Ferritin assay is widely available at most institutions; a level greater than 10,000 is highly suggestive of HLH.2 Delayed diagnosis and failure to initiate cytotoxic chemotherapy will result in a fatal outcome.
Introduction

HLH can be classified as primary or secondary. Primary HLH caused by genetic abnormalities occurs in infants and young children. Secondary HLH occurs in older children or adults, often triggered by an infection or medical condition but could also be due to genetic abnormalities. Signs and symptoms include hepatosplenomegaly, prolonged fever, cytopenias, elevated triglycerides and elevated ferritin. Complete diagnosis is made by identification of the abnormal genetic mutations or when five of the following eight diagnostic criteria are identified: fever, splenomegaly, cytopenias, hypertriglyceridemia and/or hypofibrinogenemia, hemophagocytosis, low or absent NK-cell activity, elevated ferritin, and elevated sCD25. While five of the eight criteria are required to make a complete diagnosis, not all of these criteria need to be present to suspect and begin treatment for HLH. The presence of hemophagocytosis in the bone marrow is helpful but not necessary for the initial diagnosis of HLH. A prompt diagnosis and subsequent treatment is imperative to avoid a fatal outcome.

Case Report

25-year-old previously healthy Caucasian male presented to the ED complaining of severe, sharp, anteriorly located chest pain as well as dyspnea and a syncopal episode. Review of system was otherwise negative for fever, chills, night sweats. The patient had no significant past medical, surgical, family or social history. Initial physical exam was negative for fever, rash, pallor, and hepatosplenomegaly. Initial labs showed hyponatremia and an elevated C-reactive protein but otherwise not significant. Soon after presentation, he became confused and combative then developed hypotension and respiratory failure requiring intubation, large volume fluid resuscitation and hemodynamic support with multiple vasopressors. On day #2 of his hospitalization, he began having fevers. He further developed cytopenia with platelets as low as 28,000/mL and hemoglobin as low as 8.8 g/dL. He began showing signs of multisystem organ failure with respiratory failure requiring mechanical ventilation, transaminitis with alanine transaminase (ALT) >1400 and aspartate aminotransferase (AST) >2800 and renal failure requiring continuous renal replacement therapy. He developed coagulopathy with an INR as high as 2.9 as well as hypofibrinogenemia, with fibrinogen level as low as 144 mg/dL. At this time, hematology was consulted and the diagnosis of HLH was considered. A ferritin level was obtained and found to be markedly elevated at 56,248 ng/mL. Emergent bone marrow aspiration and core biopsy showed hemophagocytosis without signs of lymphoma or leukemia, confirming the diagnosis of HLH (Figure 1, Figure 2). A viral panel consisting of EBV, CMV, parvovirus B19, toxoplasma, HIV, and hepatitis was obtained and found to be negative. CT scan of the head showed sinusitis. Triglyceride levels were obtained and not found to be elevated. The patient was started on dexamethasone and etoposide treatment which led to marked clinical improvement allowing for extubation, resolution of organ dysfunction and eventual discharge. He subsequently underwent maintenance etoposide chemotherapy however, his ferritin levels began to increase; therefore he was referred for genetic testing as well as hematopoietic stem cell transplant.
Discussion
HLH is a potentially fatal hyper inflammatory condition with an incidence of 1.2 cases per million children a year. Incidence in the adult population is unknown. It is thought to be caused by over activity of antigen presenting cells and lymphocytes leading to multisystem inflammation and eventually leading to organ failure. HLH can be classified as primary or secondary. Primary HLH occurs in children typically less than 18 months of age and is caused by one of several genetic mutations. Secondary or viral-associated HLH occurs in older children or young adults. Secondary HLH is triggered by infection, malignancy, or rheumatologic abnormalities. Genetic mutations in secondary HLH have been reported.

Diagnostic criteria for HLH used in the HLH-2004 trial. The diagnosis of HLH is established by:

A. A molecular diagnosis consistent with HLH: Pathological mutations of PRF1, UNC13D, Munc18-2, Rab27a, STX11, SH2D1A, or BIRC4
   -OR-
B. Five out of the eight criteria listed below are fulfilled:
   1. Fever >38.5
   2. Splenomegaly
   3. Cytopenias (affecting at least 2 of 3 lineages in the peripheral blood)
   4. Hypertriglyceridemia (>265 mg/dL, fasting) and/or hypofibrinogenemia (<150 mg/dL)
   5. Hemophagocytosis in bone marrow, spleen, lymph nodes, or liver
   6. Low or absent NK-cell activity
   7. Ferritin >500 ng/mL
   8. Elevated soluble CD25 (alpha chain of soluble IL-2 receptor)

Infections that may be associated with HLH include but are not limited to: Epstein-Barr virus, cytomegalovirus, herpes simplex, HIV, influenza, parvovirus B19, rubella, and varicella zoster. Autoimmune disorders including systemic lupus erythematosus and rheumatoid arthritis may trigger HLH. Certain malignancies such as lymphomas are also frequent triggers of HLH.

Although there are eight diagnostic criteria for HLH, it is not always necessary to meet 5 of the 8 criteria to diagnose and treat HLH. A review of charts of pediatric patients with elevated ferritin level at a large pediatric hospital in 2007 revealed that a ferritin level of more than 10,000 ng/mL was 90% sensitive and 96% specific for HLH. Although the patient in this case had a ferritin level that was highly specific for HLH, he also met 5 out of 8 diagnostic criteria including cytopenia, fever, hypofibrinoginemia, hemophagocytosis as well as hypofibrinogenemia. Labs such as NK-cell activity and soluble CD25 were not readily available at our institution therefore, these labs were not obtained.
It is recommended that treatment be initiated when clinical suspicion exists, even before all diagnostic studies are available in order to prevent further organ damage. Prior to initiation of current treatment regimens, the 1-year survival rate of children with HLH was close to 0%.5 Induction therapy for HLH includes an 8-week course of etoposide and dexamethasone as recommended in HLH-94 trial published in 2011.4 At 6.2 years of median follow-up, estimated 5-year survival was 54% ± 6%. Patients with familial disease had a 5-year survival of 50% ± 13%; none survived without HSCT.6

Conclusion

Hemophagocytic lymphohistiocytosis is a relatively uncommon condition; however it should be considered in the differential diagnosis of a patient with sepsis and multisystem organ failure of unknown etiology. Ferritin assay, a relatively inexpensive test, may facilitate the diagnosis of HLH. Failure of prompt diagnosis and treatment will invariably lead to a fatal outcome.

References

The Breast Center at CAMC continues to evolve, solidifying its contribution to the community with a range of services accessed by patients with increasing frequency. Among these, the ability to evaluate patients quickly has resulted in an influx of women who otherwise would have been forced to endure some of the processes associated with an older model of care. Now, the sequence of mammography, further diagnostic tests if needed, biopsy if indicated and treatment decisions follows a rapid sequence which enables patients to be taken care of in a short time period.

The Breast Center infrastructure has been tested by time, and the results have proven to be nothing short of spectacular. Each step of the processes linked to the gamut of services offered is firmly supported by skillful providers. The role of the Breast Navigator continues to grow, with the support thus provided touching a progressively larger population of patients. Mammographic and imaging services are streamlined so physicians referring patients to the Breast Center can choose to participate in the RAPID CALL BACK and RAPID DIAGNOSTIC programs, which allows them to expedite the care of their patients. These and other processes of care are now being offered to an expanded population of patients and doctors. The results are a simpler and more effective way to provide access to important services and quickly solve all problems of patients with breast diseases.

Outstanding progress is being made in several service areas. For instance, the routine risk evaluation that is given to any patient who enters the Breast Center has been redesigned and a formal Risk Clinic is about to open its doors under the direction of Dr. W. Trammell, a Professor of Surgery at West Virginia University with years of advanced expertise in the diagnosis and care of patients with breast diseases. The Risk Clinic will provide risk evaluation, risk analysis, genetic testing and genetic counseling to patients in need of these services. These patients will be identified by their referring physicians, by a profile drawn by
specially trained nurses or by a genetic counselor who will soon be a member of the Breast Center staff. The Clinic will focus on patients at risk for breast cancer, but the program will expand to patients who might be at risk for colorectal and gynecological cancer as well. This effort will link this service to those offered by the Cancer Center and in this manner it will create a seamless process for patients to benefit from these services.

Patients are already accessing the Risk Clinic on their doctor’s advice, and a significant number of them have already received genetic testing. These improvements have facilitated the decision-making of the multidisciplinary group that convenes weekly to determine the best options of treatment for patients diagnosed with breast cancer.

Outreach programs to help the community and the state are almost ready to be implemented. In the following months, the Breast Center will put in place a program of conferences for the public, to inform and educate on issues of prevention and treatment of breast cancer.

These and many other programs undergo routine scrutiny and evaluation by the group of experts that manages the operations of the Breast Center. The result of these activities is a clear direction for the Breast Center, which continues its advance using the most current and proven scientific methods in use to assist patients with breast concerns. The gamut of services and programs available at The Breast Center are offered in a pleasant physical environment which is warm and welcoming because of its skillful and compassionate staff.
Oncology unit renovation will create comfortable, healing environment

Martha Taylor, RN, OCN, clinical management coordinator
Jennifer Ferrell, RN, OCN, nurse manager

Exciting changes continue to take place on the inpatient oncology unit. A complete renovation is underway to create a comfortable environment that will promote healing for patients and their families.

All 29 rooms and baths are private and conducive to individualized care that promotes family involvement and maximizes comfort. There are sofa beds in each room to accommodate care partners who may wish to stay with their loved ones.

The unit has a dedicated, highly skilled and efficient team of professionals available to meet the diverse needs of patients during an intensely challenging time in their lives.

Other improvements include the addition of a new conference room for meetings and staff education, a larger break room for staff, an ample physician dictation room and an improved family resource room stocked with the latest health information available. Renovations should be completed by spring 2013.

The nursing staff is excited about the positive changes that are happening in the department. They look forward to caring for their patients in a beautiful, well-designed space.
Ambulatory Infusion Center
Martha Taylor, RN, OCN clinical management coordinator
Jennifer Ferrell, RN, OCN, nurse manager

In addition to services provided at DLCC, the outpatient Ambulatory Infusion Center meets the needs of patients requiring a variety of infusion services. The newly renovated space provides a comfortable and convenient setting for patients needing blood transfusions, antibiotic therapy, injections, chemotherapy and PICC line insertions. The center, located at CAMC Memorial Hospital, is staffed by a dedicated and efficient team of nurses and is open 7 days a week. Appointments are made by physician referral.

CAMC Hemophilia Treatment Center
The CAMC Hemophilia Treatment Center (HTC) is a federal and state funded program that sees patients who have a congenital bleeding disorder, such as hemophilia and von Willebrand’s disease. Care is provided throughout the life span. Clinics are offered for both pediatrics and adults at CAMC Memorial Hospital with three clinics in Teays Valley annually. Dr. Steven Jubelirer is the medical director and adult hematologist. Dr. Allen Chauvenet and Dr. Chibuzo O’Suoji are the pediatric hematologists.

The federally funded Hemophilia Treatment Centers were originally a pilot program through the Centers for Disease Control and Prevention for comprehensive care. During clinic visits, approximately 175 patients annually are seen by a hematologist (adult or pediatric), RN, social worker, and physical therapist. It has been shown that people with congenital bleeding disorders who are seen in a HTC have less complications, live longer, and reducing the number of hospital admissions.

A 340B factor program was started two years ago in which the HTC distributes required factor products through a contract pharmacy to the patients. This gives the patients the additional choice of providers and allows the HTC revenue in which must be used for program and patient costs.
RESEARCH AND OUTCOMES

CAMC Cancer Statistics by Stage
CAMC Benchmark and Survival Rates
US Cancer Statistics
The Center for Cancer Research is primarily involved in cooperative group treatment and prevention studies sponsored by the National Cancer Institute (NCI). Current affiliations include: the National Surgical Adjuvant Breast and Bowel Project (NSABP), Eastern Cooperative Oncology Group (ECOG), and the Southwest Oncology Group (SWOG).

Additionally, the Cancer Research Center is now opening new pharmaceutical sponsored trials of interest to clinicians and patients.

The Cancer Research Center currently maintains 65 protocols at the center, opening additional protocols for cancer patients each month. More than three hundred patients are currently enrolled in adult cancer research trials at CAMC.

Referrals to the research center come from private physicians, oncologists, surgeons, urologists, radiologists, and from patients themselves. The Center works closely with the David Lee Cancer Center, which is affiliated with CAMC.

Participation in research, a surrogate for a versatile and leading edge cancer program, is a requirement for our status with the American College of Surgeons. The College provides standards for cancer programs, such as the one established at CAMC, assuring patients and their families of optimal care. The goal of the Cancer Research Center is to provide opportunities to participate in research trials for a variety of cancers to patients in this area, allowing patients of the Kanawha Valley opportunities to participate in research trials here at CAMC. Important to patients and their families, having these trials available at CAMC allows patients of this area to participate in research, and at the same time remain close to family and friends.

In addition to the aforementioned partnering NCI affiliations, we have access to several cooperative group trials through the CTSU (Clinical Trials Support Unit). Sponsored by the NCI, the CTSU allows sites access to protocols without the requirement of group membership. We have recently become active members with RTOG (radiation treatment group trials), allowing for prostate cancer treatment in cooperation with Charleston Radiation Therapy Associates. This has complimented CAMC’s movement toward offering a focused center of excellence in prostate health.

With increased funding via NIH and private industry in the area of cancer research, we are pleased to be a small part of bringing the resulting accelerated research innovation to our community. Recently, we have added several research protocols that involve state of the art technology, such as gene mapping, and molecular markers to determine therapies for cancer treatment. We also have protocols utilizing novel chemotherapeutic agents for frontline therapy, as well as protocols for advanced cancers, both of which give cancer patients at various stages of disease ready access to cutting-edge research in their home communities.
Data management and regulatory functions are often opaque aspects of a research program; however they are substantively important in maintaining a quality research program. We have undertaken efforts to improve related processes. There has been improvement in our working through a centralized IRB review of cancer protocols, allowing a more efficient and less burdensome delivery of approved research protocols to our patients. Implementing revised local IRB guidelines for submissions has greatly streamlined paperwork flow (often times hundreds of pages for review and approval) between internal and external offices.

The Center for Cancer Research is located in Suite 203 of the CAMC Medical Staff Office Building, one floor above the David Lee Cancer Center, allowing for more convenient physician and patient access. New patient referrals are taken immediately, allowing clinic patient flow to continue without interruption. Access to the Center’s medical records area, the oncologist’s transcriptions through EMON, and the use of Medical Manager have also helped to reduce the data delinquency rates by allowing our staff more ready access to the information necessary for patient reporting to the study groups.

The Cancer Research Center welcomes referrals from all disciplines, and looks forward to serving well the West Virginia community. In addition to referrals, availability of specific research protocols may be known by contacting us via phone (304) 388-9936 or (304) 388-9940 or email karen.shirey@camc.org, or augusta.kosowicz@camc.org.

**Staff**

Steven Jubelirer, MD, Senior Research Scientist
Karen Shirey, RN, BSN, Research Coordinator
Augusta Kosowicz, PA-C, Research Coordinator
Megan Ware, Research Assistant
Jongie Shelton, Research Assistant
B. Daniel Lucas, Jr., PharmD, Director
The David Lee Cancer Center continues its commitment to the American Society of Clinical Oncology’s (ASCO) voluntary initiative known as QOPI, Quality Oncology Practice Initiative.

Commenced in the spring of 2011, this voluntary substantial undertaking is designed to promote excellence in comprehensive cancer care through a retrospective chart review within the practice. QOPI allows the David Lee Cancer Center to determine where the practice’s strengths are and where there is room for improvement. As the David Lee Cancer Center seeks QOPI Certification it has improved several areas of cancer care for our patients, including:

- Family history questionnaires to help screen for genetic testing;
- Increased focus on the patient’s pain and emotional well-being; and
- Plans to incorporate a chemotherapy treatment summary plan into the design of the center’s EMR System.

According to Beverly Farmer RN, OCN, CNIII, Practice Administrator at the David Lee Cancer Center, “The QOPI efforts of the physicians and staff have caused an even greater collaboration in the care process resulting in noticeable improvements in our delivery of care and quality of life for our patients. These efforts to obtain certification require much, much behind the scene work by the center. Close monitoring and self-critiquing is ongoing. Over the past three data entry periods in excess of 325 charts were extracted, analyzed, and reported. This consuming effort is beginning to show results separate and apart from progress in obtaining certification for the David Lee Cancer Center.”

Three data entry periods have shown several improvements including the following:
The David Lee Cancer Center is committed to continuing to improve patient care and QOPI is but one part of this effort.
RQRS Comparison Information on Performance Rate in all 2009-2011  
_Susan Thompson, CTR_

CAMC continues to voluntarily participate in the CoC Rapid Quality Reporting System (RQRS) – colon, rectal and breast cases diagnosed and/or treated at CAMC during 2009-2011 and can be compared with other accredited cancer programs.

1. Radiation Therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer.

<table>
<thead>
<tr>
<th>Facility Comparison Groups</th>
<th>Comparison Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>Charleston Area Medical Center</td>
<td>87.3%</td>
</tr>
<tr>
<td>Teaching Research Programs</td>
<td>87.3%</td>
</tr>
<tr>
<td>All Programs within United States</td>
<td>90.0%</td>
</tr>
</tbody>
</table>

2. Tamoxifen or third generation aromatase inhibitor is considered or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0Mo, or Stage II or III hormone receptor positive breast.

<table>
<thead>
<tr>
<th>Facility Comparison Groups</th>
<th>Comparison Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>Charleston Area Medical Center</td>
<td>96.8%</td>
</tr>
<tr>
<td>Teaching Research Programs</td>
<td>81.9%</td>
</tr>
<tr>
<td>All Programs within United States</td>
<td>84.5%</td>
</tr>
</tbody>
</table>

3. Combination chemotherapy is considered or administered within 4 months (120 days)
of diagnosis for women under 70 with AJCC T1cN0M0 or Stage II or III hormone receptor negative breast.

### Facility Comparison Groups

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charleston Area Medical Center</td>
<td>90.5%</td>
<td>94.7%</td>
<td>95.2%</td>
<td>85.7%</td>
</tr>
<tr>
<td>Teaching Research Programs</td>
<td>86.6%</td>
<td>87.2%</td>
<td>87.1%</td>
<td>88.2%</td>
</tr>
<tr>
<td>All Programs within United States</td>
<td>88.8%</td>
<td>88.6%</td>
<td>89.1%</td>
<td>87.1%</td>
</tr>
</tbody>
</table>

4. At least 12 regional lymph nodes are removed and pathological examined for resected colon cancer. Please note our Physician Liaison did an Audit of regional lymph nodes removed and you will see the numbers reflect this information.

### Facility Comparison Groups

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charleston Area Medical Center</td>
<td>82.8%</td>
<td>84.7%</td>
<td>70.8%</td>
<td>83.7%</td>
</tr>
<tr>
<td>Teaching Research Programs</td>
<td>86.1%</td>
<td>88.7%</td>
<td>89.3%</td>
<td>89.6%</td>
</tr>
<tr>
<td>All Programs within United States</td>
<td>84.9%</td>
<td>87.6%</td>
<td>88.3%</td>
<td>88.9%</td>
</tr>
</tbody>
</table>

5. Adjuvant chemotherapy is considered or administered within 4 months (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer.

### Facility Comparison Groups

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charleston Area Medical Center</td>
<td>95.0%</td>
<td>100%</td>
<td>88.2%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Teaching Research Programs</td>
<td>94.4%</td>
<td>84.7%</td>
<td>83.4%</td>
<td>82.0%</td>
</tr>
<tr>
<td>All Programs within United States</td>
<td>87.3%</td>
<td>85.8%</td>
<td>85.8%</td>
<td>84.6%</td>
</tr>
</tbody>
</table>

6. Radiation therapy is considered or administered within 6 months (180 days) of diagnosis for patients under the age of 80 with clinical or pathologic AJCC T4N0M0 or Stage III receiving surgical resection for rectal cancer.

### Facility Comparison Groups

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charleston Area Medical Center</td>
<td>85.7%</td>
<td>80.0%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Teaching Research Programs</td>
<td>93.6%</td>
<td>90.8%</td>
<td>87.9%</td>
<td>86.5%</td>
</tr>
<tr>
<td>All Programs within United States</td>
<td>90.4%</td>
<td>90.8%</td>
<td>88.5%</td>
<td>89.2%</td>
</tr>
</tbody>
</table>
The Commission on Cancer (CoC) maintains information from data submitted each year, sorting the cancer cases by site and by stage. Once the facility reviews the data and agrees it is accurate, the facility may allow the CoC to share this data publicly. The Cancer Committee reviewed this data at the July meeting for the 2010 data and approved it for distribution to the American Cancer Society.

Points of interest in these graphs include a continued improvement in the staging as can be demonstrated in every graph by the sharp decline in “unknown” stage for each of these cancers in recent years. CAMC’s Cancer Committee’s goal for staging is 100% of eligible cases to have staging documented.
Notice: When comparing survival rates between your cancer program and all other CoC-accredited cancer programs: if the confidence intervals of stage-specific or overall survival rates overlap after five years, then there is no statistical difference between survival rate of patients at your facility with that of other CoC-accredited cancer programs.
Notice: When comparing survival rates between your cancer program and all other CoC-accredited cancer programs: if the confidence intervals of stage-specific or overall survival rates overlap after five years, then there is no statistical difference between survival rate of patients at your facility with that of other CoC-accredited cancer programs.
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Notice: When comparing survival rates between your cancer program and all other CoC-accredited cancer programs: if the confidence intervals of stage-specific or overall survival rates overlap after five years, then there is no statistical difference between survival rate of patients at your facility with that of other CoC-accredited cancer programs.
Collaborative effort with American Cancer Society to improve colon cancer outcomes

Ebenetta M. Rhinehart, MBA, RHIA, CCS, CTR

At the January 2012 Cancer Committee meeting, the American Cancer Society (ACS) presented facts and figures on colorectal cancer with an emphasis on West Virginia facts and figures. Colorectal cancer is the third most common and the third deadliest cancer in the United States with consistently declining incidence and death rates over the past 20 years. This is largely attributed to screening and polyp removal before progression to more invasive cancers, use of screenings to diagnose cancers at an earlier and more treatable stage, as well as advances in the treatment of colorectal cancers.

Statistics show that West Virginia’s colorectal screening rates are in the lowest category (less than 57.3%) in the United States and the only state in the southeast region with a low percentage of screening. West Virginia is also the state with the highest mortality rate for colorectal cancer. The low screening rate is assumed to contribute to West Virginia's high mortality rate.

The Cancer Committee felt this was an important initiative to improve cancer care in West Virginia and for our patients. The American Cancer Society offered tools to CAMC to model after a Louisville Kentucky hospital that demonstrated a 20% increase in screening. A plan was developed in two phases. Phase one is completed in that CAMC began collecting information from patients during the inpatient admission nursing assessment, asking if the patient has had a colon cancer screening within the past 10 years. Phase two will be completed later in 2012 where the information will be sent via interface to a system that can produce letters to the patients reminding them of the appropriate screening for the patient's gender.

CAMC is working on identifying a baseline data on screening colonoscopies and/or cancers identified through screenings in order to track the impact of this initiative on colon cancer care in our communities. The cancer committee will continue to monitor colon cancer and the patient outcomes over the coming years.
In order to allow facilities to monitor quality initiatives, the Commission on Cancer (CoC) maintains the Cancer Program Practice Profile Report (CP3R) site. This allows CAMC to benchmark performance on accountability and quality initiatives related to breast, colon and rectal cancers and to compare performance with other accredited facilities in the state, the region, the same accreditation classification, or all accredited facilities. Some of the results may be falsely low due to the patients returning to their local communities for cancer treatments.

The CoC CP3R chart is on page 39, but the tables to the right demonstrate CAMC’s performance against other accredited facilities. The checkmarks show that CAMC has met and exceeded the minimum quality standards for all four of the accountability measures and the two quality measures for the most recent years reported by the CoC, 2009 and 2010. CAMC is compared to other accredited facilities in WV, other accredited facilities in the census region of the South Atlantic, other accredited facilities in the southeast region, other accredited facilities with the same accreditation status, and finally all accredited facilities. This information provides a robust comparison on CAMC’s performance in these areas of our cancer program.
## Interpreting This Report

The estimated performance rates shown below provide your cancer program with an indication of the proportion of breast and colorectal patients treated according to recognized standards of care by diagnosis year. These proportions are computed based on data directly reported from your registry to the NCDB. This Cancer Program Practice Profile Reports (CP3R) application provides cancer programs with the opportunity to examine data to determine if these performance rates are representative of the care provided at the institution. Cancer programs have the ability to review and modify cases by clicking on "case review" for the measure of interest. Displayed performance rates are immediately updated once modifications via the CP3R are completed by cancer program staff, comparison rates are updated nightly. Note: Any modifications made online should be reflected at the local cancer registry. Cancer programs are encouraged to resubmit reconciled cases to the NCDB.

### Select Breast & Colorectal Measures

<table>
<thead>
<tr>
<th>Measure Description</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer. [BCS/RT]</td>
<td>94%</td>
<td>88.6%</td>
<td>95.8%</td>
<td>87%</td>
<td>88.5%</td>
<td>95.9%</td>
<td>88.6%</td>
</tr>
<tr>
<td>Combination chemotherapy is considered or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1c N0 M0, or Stage II or III ERA and PRA negative breast cancer. [MAC]</td>
<td>94.7%</td>
<td>83.3%</td>
<td>90.5%</td>
<td>84.6%</td>
<td>95.2%</td>
<td>94.1%</td>
<td>95%</td>
</tr>
<tr>
<td>Tamoxifen or third generation aromatase inhibitor is considered or administered within 1 year (365 days) of diagnosis for women with AJCC T1c N0 M0, or Stage II or III ERA and/or PRA positive breast cancer. [HT]</td>
<td>95.4%</td>
<td>94.4%</td>
<td>96.9%</td>
<td>92%</td>
<td>98.9%</td>
<td>97.3%</td>
<td>95.7%</td>
</tr>
<tr>
<td>Adjuvant chemotherapy is considered or administered within 4 months (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer. [ACT]</td>
<td>94.7%</td>
<td>95.2%</td>
<td>87.5%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer. [12RLN]</td>
<td>49.2%</td>
<td>57.1%</td>
<td>80.6%</td>
<td>65.5%</td>
<td>89.2%</td>
<td>87.5%</td>
<td>77.6%</td>
</tr>
<tr>
<td>Radiation therapy is considered or administered within 6 months (180 days) of diagnosis for patients under the age of 80 with clinical or pathologic AJCC T4N0M0 or Stage III receiving surgical resection for rectal cancer. [AdjRT]</td>
<td>100%</td>
<td>85.7%</td>
<td>71.4%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Background

The National Quality Forum (NQF) brought public and private payers together with consumers, researchers, and clinicians to broaden consensus on performance measures for breast and colorectal cancer. The performance rates shown in the Cancer Program Practice Profile Reports (CP3R) match the specifications of the breast, colon and rectal cancer care measures endorsed by the NQF in April, 2007. The Commission on Cancer has been actively engaged in this process. The CoC has instituted the CP3R as a facility feedback mechanism to promote awareness of the importance of charting and coding accuracy in line with evidence based practice guidelines. In light of the national movement towards Pay for Performance (P4P), these reports provide CoC-Approved programs with the ability to examine program-specific breast, colon and rectal cancer care practices.
Top Six Sites in 2011 at CAMC

- LUNG/BRONCHUS-NON SM CELL (19.7%)
- BREAST (24.4%)
- PROSTATE (16%)
- COLON (10.3%)
- KIDNEY AND RENAL PELVIS (8.2%)
- CORPUS UTERI (8.5%)
2011 CAMC Top 11 Cancer Diagnoses by Gender

<table>
<thead>
<tr>
<th>Primary Site</th>
<th>Percent</th>
<th>Men 764</th>
<th>Women 827</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>21.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung and Bronchus, non-small cell</td>
<td>14.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>9.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney and renal pelvis</td>
<td>6.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hodgkin’s Lymphoma</td>
<td>4.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leukemia</td>
<td>4.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bladder</td>
<td>4.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pancreas</td>
<td>3.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stomach</td>
<td>3.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown/Ill-defined</td>
<td>2.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung, small cell</td>
<td>2.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other sites</td>
<td>22.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Site</th>
<th>Percent</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>29.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung and Bronchus</td>
<td>10.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corpus Uteri</td>
<td>10.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>9.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hodgkin’s Lymphoma</td>
<td>4.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovary</td>
<td>3.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney and renal pelvis</td>
<td>3.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid</td>
<td>3.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leukemia</td>
<td>2.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pancreas</td>
<td>2.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cervix Uteri</td>
<td>2.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other sites</td>
<td>18.1%</td>
<td></td>
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</tr>
</tbody>
</table>
CAMC Oncology Services
2011 Incidence of New Cancer Cases

Source: CAMC Cancer Registry, American College of Surgeon website
CAMC Planning Department 8/13/12
Patient Navigation at the David Lee Cancer Center
By Sarah Huff, RN, BSN, OCN, CNII, Jennifer Bass, CMA, precertification specialist

According to the Merriam-Webster dictionary, navigation is defined as 1) the act or practice of navigating; 2) the science of getting ships, aircraft, or spacecraft from place to place; especially: the method of determining position, course, and distance traveled.

So what does navigation have to do with the health care system and what do ships, aircrafts, or spacecrafts have to do with patient care, especially in the field of oncology?

When an individual hears the words, “you have cancer,” their world (if even for only a minute) stops. Their mind begins to race with millions of questions like “What stage of cancer is it? What type of treatment will I need? How will my family be affected? Will I be able to work? Am I going to live?” Panic may set it and patients begin to feel overwhelmed. There is so much that is going on right now and so much on their mind they are not quite sure which direction they need to be going in. That is where patient navigation steps in.

CAMC cancer services take a patient focused approach in which trained individuals’ proactively guide patients through and around barriers in the complex cancer system. This method is referred to as patient navigation. The purpose of patient navigation is to ensure that all patients with a suspicious finding receive timely diagnosis and treatment, as well as assistance in navigating through the health care system. Attempting to maneuver through the health care can be just as overwhelming as receiving the initial diagnosis. So, patients, in comparison with ships, are navigated through a very complex and sometimes confusing health system in order to assure that they reach their destination safe and sound and in a timely manner.

In November of 2010 the David Lee Cancer Center introduced their first patient navigator, Sarah Huff, RN, BSN, OCN. Huff is the colorectal patient navigator at the DLCC and she “navigates” all patients diagnosed with colon or rectal cancer through the health care system with ease. As the dedicated colorectal navigator Huff is able to arrange for consultations/referrals, answer questions that relate to treatment or appointments, or assist with psychological/spiritual concerns. Other areas of assistance may include transportation, financial, or support issues. Huff’s goal is to assure that patients receive the highest quality of care and that someone is there to guide them every step of the way.
“Patients have enough to worry about when they are diagnosed with cancer. They should not have to have the added stress of trying to determine where they need to go next, why they need to go there, and who they should talk to when they have questions. My job as the navigator is to be their eyes, ears, legs and even voice (if needed) for the patient so that they can focus on more important issues,” Huff said.

The patient navigator’s job is to assist patients and their family members in resolving any barriers that may keep them from receiving the care they need and to connect them with the resources they may need. Our patient navigation will continue to grow with the hopes of adding four more patient navigators over the next two to three years.

Another navigator that was introduced in spring of 2011 and is also located at the DLCC is Jennifer Bass, CMA, precertification specialist, and serves as the financial navigator.

The financial navigation program offers assistance with applying for WV Medicaid, Social Security Disability, and grants through a variety of local, state, and national nonprofit cancer organizations. Bass also facilitates applications through manufacturing companies for assistance with co pays for infusion therapies, oral chemotherapy medications, as well as nutritional supplements. In addition, the financial navigator can assist with insurance denials and appeals, coordinate insurance benefits, and provide out of pocket analysis for outpatient infusion services. The recordable amount of assistance provided from January 2012 to August of 2012 is an astounding $2,034,907.30. Bass has also gone beyond the health care setting by also assisting patients with finding aid for transportation, housing, food, and social services.

Patient navigation is a benefit to the community and to the patient by saving lives through outreach and education, eliminating barriers to care, and providing a timely delivery to care. If you would like to get in contact with either of the patient navigators you may reach Sarah Huff at (304) 388-4995 or Jennifer Bass at (304) 388-8359.
Endoscopic Ultrasound (EUS)
Jeremy R. Stapleton, DO

Endoscopic Ultrasound (EUS) combines endoscopy and ultrasound in order to obtain images and information about the digestive tract and the surrounding tissue and organs.

“When the procedure is performed, conscious sedation is administered. Once the patient is sedated, a special endoscope is inserted which has a camera for direct visualization of the esophagus, stomach, small bowel, or colon; as well as an ultrasound probe for examination of surrounding structures,” said Jeremy R. Stapleton, DO.

At that time, the physician observes the inside of the intestinal tract on a television monitor and the ultrasound image on another monitor. The entire procedure takes about 30 to 90 minutes, depending on the complexity and whether or not fine needle aspiration (FNA) is performed.

“Endoscopic ultrasound has become a crucial part of the diagnosis, staging and management of numerous gastrointestinal and mediastinal diseases,” Stapleton said.

EUS can help diagnose via FNA and stage gastrointestinal cancers including pancreatic, esophageal, gastric, duodenal, ampullary, and colorectal cancers. Other indications for EUS include; evaluation for chronic pancreatitis, evaluation of pancreatic masses, detection of common bile duct stones, assessment of enlarged stomach folds or submucosal masses that may be unreachable by surface biopsies, and safely and accurately collect fluid samples from the abdominal cavity or pancreatic cysts for analysis.

“There are probably fewer than five physicians performing this procedure throughout the state, and three of them are here at CAMC,” Stapleton said. “Endoscopic ultrasound can have extremely important implications in diagnosis and management through diagnostic FNA and staging of cancers.”
Radiology

The Department of Radiology provides diagnostic and interventional imaging services for the clinical and research programs at CAMC. 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 department of diagnostic imaging offers a full complement of screening, diagnostic and non-vascular interventional radiological technologies. Modalities offered include X-ray, fluoroscopy, ultrasound, digital mammography, 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.

In CT we have a fixed 16 slice CT scanner combined with a fixed PET scanner; one 256-slice CT scanner, two 128-slice scanners, one 64-slice CT scanner and two 16-slice CT scanners.

In 2012, CAMC Women and Children’s Hospital unveiled its newest 128-slice CT machine. It is an upgrade from before making faster scans and equipped with low-dose technology allowing a lot less radiation to be used – while a computer program boosts the quality of the image.

The renovated CT room also features an ambient experience which creates a friendly atmosphere for both children and adults.

The room is specially-designed with curved walls for projecting images, providing a movie theatre-like experience without glasses or headphones needed. It also teaches patients about the critical aspects of getting a CT scan like holding their breath and remaining still at certain times. It may tell them to act like a blowfish, inhale and hold their breath as an animated blowfish is projected on the wall providing an illustration.
An important aspect of the system is the patient actually chooses the room theme before their scan using a special control pad. This interaction between patient and equipment is designed to make people more relaxed and move their attention away from any anxiety caused by the impending procedure.

In women’s imaging, CAMC offers all digital mammography. 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 World Wide Web. This conversion to an integrated Picture Archiving, Communication and Storage system has eliminated standard X-ray film. This new technology provides improved accuracy, efficiency and satisfaction by patients and clinicians.
As an integral part of Charleston Area Medical Center, the Department of Urology strives to provide excellence in patient care, teaching and research within the specialty of pediatric and adult urology. Our team of over 40 physicians, nurses and staff are dedicated to providing state-of-the-art care within a compassionate and caring environment.

Our medical team focuses on providing the best possible care for individuals experiencing such illnesses as prostate cancer, bladder cancer, adrenal cancer, kidney cancer and other kidney anomalies, testicular cancer, female and pediatric urological conditions, impotence and infertility, urinary tract infections, incontinence and bladder dysfunction. We provide an integral part of the treatment plan for those afflicted with genitourinary cancers including state-of-the-art treatment for all of these malignancies.

Because each individual’s health care needs are unique, every patient has an individualized plan of care. We combine compassion and respect with the very best in medical and surgical care. This approach coupled with the expertise of our board-certified physicians and dedicated staff enables the department to be a leading provider of urological health care in the state and the region.

The establishment of the CAMC Urologic Surgery residency in 2006 marked a new era in the department of Urology. Teaching of future urologic surgeons to further enhance the quality of urologic care in the region became a priority. Since that time, the residency has grown to include 10 total resident physicians from all across the U.S. For the past three consecutive years our graduating residents have been awarded the ACOS resident achievement award for their accomplishments as a resident.

In 2011, the department established a multidisciplinary genitourinary cancer conference. This conference now meets bimonthly to discuss and review all complicated cases of prostate, bladder, kidney, testicular and penile cancer. Specialists attending the conference include urologist, radiologist, medical oncologist, radiation oncologist and the areas first dedicated genitourinary pathologist. This multidisciplinary approach ensures every patient receives the opinion of multiple professionals prior to proceeding with their individualized care. Improved outcomes and prolonged survival are the goals of the conference and patients can be assured they are receiving a multidisciplinary care plan to ensure we reach these goals.

In 2007, led by department chairman Dr. J.P. Tierney, CAMC purchased the first of two current da Vinci surgical robots. As of September 2012 we completed more than 1,500 robotic procedures. Our dedicated robotic nursing team and ancillary staff enable us to continually improve the patient
experience. Robotic procedures currently performed by CAMC urologist include radical prostatectomy, pelvic lymph node dissection, partial and radical cystectomy, partial and radical nephrectomy, pyeloplasty, ureteral reimplantation and adrenalectomy. Benefits of the robotic procedures include improved visualization, less blood loss, more accurate dissection, less pain, and shorter hospital stay.

Robotic assisted laparoscopic partial nephrectomy has revolutionized the care of small kidney cancers. Our recently introduced CT renal mass protocol ensures we have the necessary information to preserve as much healthy tissue as possible for each case. Utilizing the 3-D, High Definition, magnified image of the da Vinci Si surgical system, urologists at CAMC are able to preserve nearly the entire kidney while removing the entire tumor. Blood loss and pain are dramatically reduced with this procedure. Newer technology utilizing Indocyanine green dye is allowing our team to improve the accuracy of removing the tumor and sparing the kidney. When injected intravenously, the da Vinci robot is supplied with “firefly” technology, similar to a black light, causing the kidney to fluoresce and the tumor to remain black. Most patients leave the next day or 2 days after this procedure.

Bladder cancer is expected to be diagnosed in about 73,510 people in the U.S. in 2012. At CAMC, we are aggressively pursuing new avenues to diagnose, treat, and manage this aggressive disease. Hexaminolevulinic acid (Marketed as Cysview in the US) is an agent that can be instilled in the bladder and fluoresces under blue light cystoscopy helping to identify small bladder tumors. This technology has been shown to decrease recurrence of bladder cancer by allowing urologists to identify tumors that could not be seen with traditional white light cystoscopy. For advanced bladder cancer we coordinate with our medical oncology colleagues to provide chemotherapy before surgery with the da Vinci robot to further improve the chances for cure of the cancer.

In addition to the primary treatment of genitourinary cancer cases, CAMC Physicians Group – Urology has recently recruited a reconstructive urologist to assist in more difficult issues that arise as a result of radiation or surgery for cancer. Reconstruction of the male or female urethra, ureters or bladder is now routinely performed as well as all types of urinary diversions.

CAMC Physicians Group – Urology has become the leader in management of genitourinary cancer in the state and region. Our fellowship trained surgeons are capable of utilizing the most current available technology to offer the finest urologic care in the largest community in West Virginia.
Cancers of the colon and rectum occur in roughly 140,000 new patients in America each year and cause 40,000 cancer related deaths each year. This makes them the third leading causes of cancer death overall. Symptoms include bleeding, pain, change in bowel habits, and anemia. Many however are asymptomatic for some time. For this reason colonoscopy is generally recommended for all patients 50-year-old as a screening tool. Colonoscopy is the most accurate way to diagnose colorectal cancer. It provides the opportunity to identify a tumor and biopsy it but more importantly small precancerous polyps can be removed effectively lowering the risk of developing colorectal cancer. Though cancers of the colon and rectum are frequently grouped together they are treated by two very different pathways.

Once colon cancer is discovered the patient should have a CT scan of the chest abdomen and pelvis. Roughly 20 percent of patients will have metastatic disease at the time of diagnosis. Patients with non resectable metastatic disease are sent for chemotherapy unless their primary tumor is causing an obstruction or significant bleeding. Those patients whose workup shows resectable disease are referred for surgery. The goal of surgery should be to remove the primary tumor and the associated lymph nodes of the tumor. Surgery can be done in a conventional open approach or through a minimally invasive technique with a laparoscopic or robotic technique. The final pathology report determines whether a patient will benefit from chemotherapy with those patients having positive lymph nodes and some higher risk patients without lymph nodes showing a benefit.

Rectal cancer is treated differently. Historically rectal cancer had higher local recurrence rates than colon cancer. Because of this, advanced rectal cancers, such as those with positive lymph nodes or growing through the rectal wall are treated with chemotherapy and radiation before surgery. This causes the tumor to be down staged allowing for lower local recurrence rates. The preoperative stage of the tumor can be determined by a special ultrasound or an MRI. Surgery for cancer of the rectum can frequently be done without the need for permanent colostomy and is based on many factors including size of the lesion and its distance from the anus. Minimally invasive techniques are an option for rectal cancer also.

The last 30 years have seen a number of changes in the treatment of colon and rectal cancers. Improving techniques of chemotherapy, radiation, and surgery highlight the importance of a multimodal team approach between surgeons, medical oncologists and radiation oncologists.

CAMC is fully prepared to offer all the services needed as well as the coordination and cooperation of involved physicians via our Gastrointestinal Cancer Conference to devise an individualized and optimized plan of care for each unique patient.
Pediatric Oncology
Allen Chauvenet, MD

We continue to be the only full member of the Children’s Oncology Group (COG) in West Virginia. The COG is recognized as the largest cooperative group in the world with a focus on childhood cancer.

Clinical Care and COG Research Participation
Our pediatric oncology service saw 69 total registrations on COG protocols (a record) with 12 therapeutic study entries and 57 entries on biology, administrative and follow-up protocols.

Dr. Chauvenet serves as the Medical Director of the Children’s Infusion Center. Melissa Hill, RN, has recently assumed the nursing position in the Infusion Center. Alicia Harper, NP, is joining our section and will provide superb assistance in view of her extensive COG nursing background.

Dr. Lisa Palmer left to assume a position at Cincinnati Children’s Medical Center. Dr. Chibuzo O’Suoji, a graduate of the superb Pediatric Hematology/Oncology fellowship program at Northwestern University in Chicago, became our second physician at the beginning of January 2012. We have 12 other individual members of the COG and received an excellent evaluation on our audit in September 2010 (next due in September 2013).

With continued support from child life, pastoral care, clinical psychology, nutrition as well as pathology, radiation oncology, diagnostic imaging and our pharmacy program, we are well positioned to maintain and expand the excellent of our childhood cancer program.

Teaching
We provide three hours of instruction for all third year students on the pediatric rotation and present two to three pediatric grand rounds each year as well as monthly noon conferences Dr. Chauvenet and Dr. Julia Cruz have provided 2 hours of teaching to second year medical students in Morgantown in October 2010 and 2011, dealing with leukemias, lymphomas, stem cell transplant and general bone marrow disorders.

Administrative
Dr. Chauvenet continues as a member of the COG Hodgkin disease Steering Committee. HE completed his term on the National Cancer Institute-sponsored Pediatric Central Institutional Review Board (Peds CIRB) in April 2012.
In March of 2011, Dr. Chauvenet was one of four Principal Investigators among the >200 worldwide to be elected by the PIs to the COG Executive Committee. This 19-member body is the ultimate source of policy for the COG. Dr. Chauvenet is the only person to have ever served on both the Peds CIRB and the COG Executive Committee.

Our CRA, Donna Pauley, continues to do an exemplary job in data submission as our timeliness and compliance remain in the upper cohort of all COG institutions. We have begun training a part-time assistant (and future lead CRA) to keep up with our growing program.

We continue to receive support from the CAMC Foundation which allows our annual family picnic to take place, helps make our summer camp free for patients and provides support funding for families in need.

PUBLICATIONS: Dr. Chauvenet was a co-author on a significant recent publication in the Journal of Clinical Oncology and the senior author on a Hodgkin disease paper in Pediatric Blood and Cancer.


ACCEPTED JULY 2012, Pediatric Blood and Cancer (Epub; await hard copy)
Cameron K Tebbi MD1, Nancy P Mendenhall, MD2, Wendy B London, PhD3, Jonathan L. Williams, MD4, Robert E Hutchison MD5, Thomas J. FitzGerald, MD6, Pedro A de Alarcón7, MD, Cindy Schwartz, MD, MPH8, Allen Chauvenet, MD, PhD9* Response-dependent and reduced treatment in lower risk Hodgkin lymphoma in children and adolescents, results of P9426: A report from the Children’s Oncology Group

Additionally, Dr. Chauvenet was a co-author of an abstract presented at the December 2011 American Society of Hematology meeting:


Looking to the near future, Dr. O’Suoji has a paper nearing submission to Pediatric Blood and Cancer and we have IRB approval for two projects (Hereditary Spherocytosis and Evaluation of Patients referred for a prolonged PTT) which are spearheaded by pediatric residents.
CHARLESTON RADIATION THERAPY CONSULTANTS (CRTC):
AN IMPORTANT ALLY IN THE FIGHT AGAINST CANCER
By Prem Raja, MD

CRTC is CAMC’s Radiation Oncology Department encompassing the lower floor from the CAMC David Lee Cancer Center, where its dedicated team of medical experts utilizes the latest in state-of-the-art technologies to help fight cancer.

The Radiation Oncology Department involves a 45-member team consisting of Radiation Oncologists, Medical Physicists, Medical Dosimetrist, Radiation Therapists, Radiation Oncology Nurses, and support staff, each dedicated to providing excellence in patient-centered care. This includes five American Board Certified (ABR) Radiation Oncologists and three full-time, on-site American Board Certified Medical Physicists ensuring the highest standard of quality assurance.

CRTC is fully accredited by the American College of Radiation Oncology (ACRO). This accreditation process involves an in-depth appraisal of the practice facility, equipment, policies, procedures, staff and clinical treatment methods. The American College of Radiation Oncology (ACRO) concluded the CRTC Radiation Oncology practice to be “a well organized and operated radiation oncology practice that not only meets but in many aspects exceeds the ACRO Standards of practice accreditation”.

Radiation Treatment Options Available at CRTC:

- 3D Conformal Radiation Therapy (3DCRT)
- Intensity Modulated Radiation Therapy (IMRT)
- Image Guided Radiation Therapy (IGRT)
- 4D (four dimensional) CT-based treatment planning
- Stereotactic Radiosurgery (SRS): for brain
- Stereotactic Body Radiation Therapy (SBRT)
  - Stereotactic tools/systems (3): Radionics XKnife, Brain Lab’s ExacTrac, Sieman’s MVision.
- Superficial Radiation Therapy (skin cancer)
- Advanced Brachytherapy Program
  - High Dose Rate (HDR) Intracavitary Brachytherapy (uterine/cervix cancer)
  - High Dose Rate (HDR) Interstitial Brachytherapy (soft tissue sarcoma)
  - Mammosite Brachytherapy (accelerated partial breast radiation)
  - Prostate Seed Brachytherapy
- Radiation Oncology Research and Education
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.

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.

Image Guided Radiation Therapy (IGRT)

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.

CRTC offers the most advanced Image Guided Radiation Therapy currently available. We utilize daily infra-red visualization and kilovoltage-based tumor tracking using BrainLab’s Exac-Trac 6-dimensional X-ray system. This allows day-to-day accuracy to within one to two millimeters, a level of precision that is higher than what has ever been achieved before.

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 along with other technologies allows Stereotactic Body Radiation Therapy (discussed later below).

Brain Stereotactic Radiosurgery (SRS)

Stereotactic Radiosurgery is a highly precise form of radiation therapy used primarily to treat tumors and other abnormalities of the brain. This has been performed by CRTC Radiation Oncologists for more than ten years, which is longer than any other department in the state. Despite its name, stereotactic radiosurgery is a non-surgical procedure that delivers a single high dose of precisely targeted radiation using highly focused X-ray beams aimed at the brain tumor. This is usually provided in a single treatment however is sometimes provided in multiple sessions for larger tumors. SRS requires a collaborative effort between the Neurosurgeon, Radiation Oncologist, and Medical Physicist. When being treated with such high doses in a single or very few sessions, patient immobilization becomes much more important. For that reason a head frame (halo) is often placed by the Neurosurgeon. Newer devices also allow for less invasive frame-less based immobilization.
Stereotactic Radiosurgery (SRS) for the brain has been around for more than 40 years by the Gamma Knife system. Newer tools for Stereotactic Brain Radiosurgery involve LINAC based systems where a Linear Accelerator is used to deliver x-rays by way of a gantry that rotates around the patient to deliver the radiation from different angles (Gamma Knife delivers multiple beams while being stationary). The LINAC based system has a technical advantage over Gamma Knife in circumstances where the tumor is relatively large, being able to deliver a more uniform dose. CRTC utilizes such LINAC based stereotactic systems to provide SRS. The Brain Radiosurgery suite has also been updated with the latest technology. We currently use the Radionics X-knife system for SRS.

Stereotactic Radiosurgery (SRS) is an important alternative to invasive surgery, especially for tumors located deep within or close to vital areas of the brain or for patients not able to tolerate traditional neurosurgery.

**Stereotactic Body Radiation Therapy (SBRT)**

Stereotactic Body Radiation Therapy (SBRT) is a similar procedure to stereotactic radiosurgery for the brain, except it is used on tumors within the body. This is provided in 5 treatments or less (as opposed to traditional radiation which may take several weeks). SBRT is most commonly used for small tumors within the lung, liver, and spine.

SBRT is a relatively recent advancement as opposed to SRS. In the past, the ability to direct such a localized ablative form of radiation to the body was limited by previous imaging techniques, lack of optimal daily patient/tumor set-up verification, and the fact that tumors within the body move. Tumors move on a daily basis dependent on normal organ filling, emptying (GI tract, bladder) and during breathing (diaphragm). Recent advancements in imaging techniques (see 4D-CT planning above), immobilization tools (vacloc, body frames, etc.), and precise daily patient/tumor positioning verification (see IGRT above) have allowed radiation oncologists to provide SBRT.

With SBRT, local control for small tumors in many cases is as good as with surgery or better than invasive procedures. It is often utilized in circumstances where surgery is not an option. With better target localization via image guided planning and delivery, and patient immobilization, more healthy tissue near the tumor is unharmed with SBRT.

CRTC Radiation Oncologists have been providing SBRT for more than two years.
Names for Stereotactic Radiation

There is often confusion regarding the brand naming for equipment separate from the terminology of SRS or SBRT. Stereotactic radiation may be delivered by a number of different devices. Brand name stereotactic treatment machines/systems include: Axesse, BrainLab’s ExacTrac, CyberKnife, Elekta, Gamma Knife, Novalis, Primatom, Radionic’s X-Knife, Sieman’s MVision, Synergy, Tomo Therapy, Trilogy, Varian, etc.

It is important not to confuse these brand names with the actual type of stereotactic radiation under consideration. There are some technical advantages/disadvantages between the various systems, however, there has been no significant clinical advantage demonstrated between the various brand names. What is clinically significant is that the appropriate case be chosen for SRS or SBRT (stereotactic radiation) and that the optimal radiation dose/volume and fractionation (# of treatments) is provided. This will be determined by the Radiation Oncologist.

The CRTC radiation oncology practice currently has three such brand name machines/systems for delivering SRS or SBRT namely, Radionic’s X-Knife, Sieman’s MVision, and BrainLab’s ExacTrac. CRTC and CAMC are also committed to staying ahead of the technology curve through obtaining and appropriately utilizing the latest in state-of-the-art technology to better fight cancer.

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. Superficial treatment machines are not commonly found at most radiation oncology practices, however, CRTC houses just such a machine, namely, the Picker superficial x-ray unit. 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 (vaginal cuff).
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)**

CRTC radiation oncologists and Charleston surgeons offer Mammosite Brachytherapy as 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 prior to 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 CRTC radiation oncologists perform this procedure along with CAMC urologists. The Prostate Brachytherapy program has been refined at CAMC for nearly 10 years representing one of the strongest experiences in the state (over 300 cases performed).

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 modern external beam radiation therapy (see IMRT/IGRT above) or prostatectomy (also see daVinci Robotic surgery discussed elsewhere in this book). 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.
CRTC radiation oncologists 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. CAMC 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

CRTC radiation oncologists have experience treating common and very rare forms of childhood cancers at CAMC. 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. CRTC and CAMC are also 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, CRTC radiation oncologists, medical physicists, and other scientists actively participate in research through the national Children’s Oncology Group (COG).

Radiation Oncology Research and Education

CRTC and CAMC are dedicated to providing patients with the most up-to-date radiation treatment options. CRTC and CAMC 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 cancer 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.

Radiation Physics

Dimitris Mihailidis, PhD is CRTC’s Chief Medical Physicist and head of the Physics Department. One of his primary interests is to make improvements upon existing radiation treatment planning techniques. He has authored/co-authored over 40 scientific publications regarding radiation oncology treatment planning techniques and solutions. Dr. Mihailidis’ efforts ensure the highest quality and standard in radiation treatment planning at CRTC/CAMC.
**Gynecologic Oncology**

Michael Schiano, MD, is an ABOG board certified gynecologic oncologist and head of the gyn-oncology department, having more than 20 years of clinical practice and research experience. This is one of the busiest and most experienced gyn-oncology departments in the state.

A gynecologic oncologist is an Ob/Gyn who specializes in the diagnosis and treatment of women with cancer of the reproductive organs. This includes cancer of the ovary, uterus (endometrial), cervix, vagina, vulva, as well as trophoblastic disease.

There is only a limited number of American Board of Obstetrics and Gynecology certified gyn-oncology specialty training programs and as a result, a relatively small number of gynecologic oncologists are available throughout the country.

Dr. Schiano is also an associate clinical professor for the WVU/CAMC Division School of Medicine and provides clinical/surgical training for resident physicians from the CAMC Obstetrics-Gynecology Residency training program. Dr. Schiano and his team’s dedication to the education of future specialists and the multidisciplinary approach to female cancer care helps to insure optimal outcomes for women in our community.

**Pathology**

CAMC Department of Pathology Laboratory Medicine is accredited by the College of American Pathologists. The department’s 13 pathologists are all certified by the American Board of Pathology. Many of them hold subspecialty board certifications, including hematopathology, immunopathology, neuropathology, cytopathology, and transfusion medicine. Several pathologists have particular areas of expertise and interest in fine needle aspiration, gynecologic oncology, renal pathology, and bone and soft tissue tumors.

CAMC’s Department of Pathology has approximately 35,000 surgical cases and 24,000 cytology cases per year. The Department offers in-house ancillary diagnostic modalities: flow cytometry, immunohistochemistry and automated quantitative image analysis. The department has telepathology capability for intraoperative consultation between hospitals (Memorial, General, and Women and Children’s).

Pathologists participate in weekly Tumor Board Conference with oncologists, radiologists, and surgeons. Pathologists also present cases discussed at Genitourinary Pathology Conference, Neuroscience Rounds, and Orthopedic Conference. There are intradepartmental conferences held twice a week for evaluation of problematic cases.

The Department of Pathology is affiliated with West Virginia University’s Pathology Residency Program, and WVU residents regularly rotate through the various laboratory areas.
**Palliative Care**

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.

**Pastoral care**

The Pastoral Care department is available 24 hours a day and seven days a week. Its mission is to meet the spiritual and emotional needs of patients and families regardless of their spiritual status or connection to any faith.

The department is available for any ethical dilemma which may arise out of a decision making process. The scope of service includes supportive presence, spiritual counseling, help find meaning and purpose in one’s struggle and offer religious rites. Each chaplain is trained professionally to offer spiritual and emotional care in a clinical setting.

Currently, there are three full time chaplains and eight on-call chaplains available.

All chaplains are trained and/or Board Certified. All chaplains are endorsed by their respective religious body. The services of a chaplain can be requested by way of a nurse or contacting the hospital operator.

**Patient support and community outreach**

Patient support involves a team approach to improving the quality of life of patients and their families as they face the distress associated with a life-threatening illness. Services are offered through a variety of CAMC departments including education, palliative care, pastoral care and the cancer patient support program. Other resources including community agencies such as the American Cancer Society, Hospice, WVDHHR and local, state and national patient and family support services also are utilized to meet psychological, social and economic challenges. Community outreach efforts are coordinated by all cancer services and include prevention and awareness education as well as early detection and screening programs.

**Education**

The Charleston Area Medical Center Health Education and Research Institute (CAMC Institute), education division leads the oncology team in providing opportunities in professional education and research activities, patient and family health education and community information programs. In addition, CAMC Institute sponsors a monthly Didactic Tumor Board presentation.
Patient and family education

The multidisciplinary patient and family education council promotes a process for providing standards of care across the continuum. Patient and family education resources are identified, developed and reviewed by oncology experts and then processed via the council to promote consistency in education to all cancer patients and their families. The pediatric patient handbook and adult patient and family instructional handbook were developed in-house to promote ownership and individualize facility information. Resources are available online for clinical access with preprinted documentation.

More than 4,500 education videos (all topics) were requested in 2012 by patients and families during their inpatient stay at CAMC. Oncology “on demand” educational video topics include hospice, nutrition and cancer, pediatric video (Why Charlie Brown? Why?), stress and relaxation techniques and tobacco cessation. In addition a Continuous Ambient Relaxation Environment (C.A.R.E.) Programming channel runs 24/7 365 days a year to provide guided imagery, music and relaxation images to enhance healing and relaxation.

Community Education

Each year, thousands of people visit the CAMC Health Information Center website: www.healthinfocenter.org where a variety of topics including cancer prevention, treatment, and living with cancer are available in video, and printed materials for easy access. Hundreds of community members emailed or called the toll free telephone line to receive health information regarding a variety of topics including cancer.

Nearly 2,000 community members participated in the CAMC HealthFest (a one day health fair event with multiple free and low cost health screenings and educational activities). Nearly 300 people participated in the Cancer Care and Prevention activities at HealthFest. Activities included: PSA and prostate screening, skin care analysis, palliative care information, tobacco prevention, cessation class sign ups, carbon monoxide testing, clinical trial information and various cancer materials and resources were distributed by oncology clinical staff members. The 2012 CAMC Teddy Bear Fair provided pediatric focused cancer awareness and prevention information and activities as well as many other topics to more than 800 community children and their families.

Look Good…Feel Better

Cancer may take away a woman’s energy or appetite, but it does not have to take away her self-confidence. The American Cancer Society’s Look Good…Feel Better program is a free, community-based, hands-on, group workshop offered in Charleston and throughout the state of West Virginia dedicated to helping female cancer patients cope with and combat the appearance-related side effects of chemotherapy and radiation treatment.
A volunteer cosmetologist leads the program that includes a 12-step skin care and makeup program as well as demonstrations on hair/wig techniques to help restore a positive self-image.

Each participant receives a free gift kit of full size name-brand cosmetics for use during and after the workshop. This program is a partnership between the American Cancer Society, the Personal Care Products Council Foundation and the National Cosmetology Association.

The Look Good…Feel Better program is offered at the David Lee Cancer Center and CAMC Teays Valley Hospital.
The Commission on Cancer Updates Accreditation Standards
Ebenetta M. Rhinehart, MBA, RHIA, CCS, CTR

The Commission on Cancer’s (COC) Program Standards underwent a major revision in 2012. “Each and every standard was carefully reviewed for relevance, for value to the program and to patients, and to the feasibility of implementation in community settings. Many existing standards were jettisoned as outmoded, and many were refined to meet current realities and high standards for quality care” (American College of Surgeons Commission on Cancer [CoC], 2012). The emphasis in making the changes was to move from a focus on structure to a focus on patient-centered care as well as quality measurements and outcomes.

These changes included requirements for treatment, survivorship plans, palliative care services, genetics services, patient navigators and psychosocial distress screening. The new standards also set performance standards for four accountability measures and two quality improvement standards and require facilities to address performance issues with action plans that demonstrate improvements in performance.

Accountability measures are performance indicators where experience and research have demonstrated current practice is often deficient and where improvements will enhance the patient experience with care, quality of life, and treatment outcomes. Facilities are required to be at 90% or better, or to be at 90% of the upper bound 95% confidence level. Accountability measures include the following:

- Combination chemotherapy is considered or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1c N0 M0, or Stage II or III hormone receptor.
- Tamoxifen or third generation aromatase inhibitor is considered or administered within one year (365 days) of diagnosis for women with AJCC T1c N0 M0, or Stage II or III hormone.
- Adjuvant chemotherapy is considered or administered within 4 months (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer.
- Radiation therapy is administered within one year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer.

Quality measures are those that demonstrate good practice but that are not based on clinical trial evidence. Facilities are required to be at 80% or better, or to be at 80% or better, or to be at 80% of the upper bound 95% confidence level. The quality measures are:

- Radiation therapy is considered or administered within 6 months (180 days) of diagnosis for patients under the age of 80 with clinical or pathologic AJCC T4 N0 M0 or Stage III receiving surgical resection for rectal cancer.
- At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer.
CAMC performance on these measures is discussed in this report under the Rapid Quality Reporting System (RQRS) and the Cancer Program Practice Profile Reports (CP3R).

Additionally, the new standards address 12 eligibility requirements that must be met by all facilities in order to qualify for accreditation of their cancer program. These eligibility requirements involve specific services being available either on site or by referral, facility accreditation status, cancer committee authority, cancer conference policy, oncology nurse leadership, and specific policies and procedures in the cancer registry.
Age-adjusted Cancer Death Rates,* Females by Site, US, 1930-2008

*Per 100,000, age adjusted to the 2000 US standard population. †Uterus cancer death rates are for uterine cervix and uterine corpus combined.

Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancer of the lung and bronchus, colon and rectum, and ovary are affected by these coding changes.


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<table>
<thead>
<tr>
<th>Male</th>
<th>2012 Estimates</th>
<th>Female</th>
<th>2012 Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>241,740 (29%)</td>
<td>Breast</td>
<td>226,870 (29%)</td>
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<tr>
<td>Lung &amp; bronchus</td>
<td>116,470 (14%)</td>
<td>Lung &amp; bronchus</td>
<td>109,690 (14%)</td>
</tr>
<tr>
<td>Colon &amp; rectum</td>
<td>73,420 (9%)</td>
<td>Colon &amp; rectum</td>
<td>70,040 (9%)</td>
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<tr>
<td>Urinary bladder</td>
<td>55,600 (7%)</td>
<td>Uterine corpus</td>
<td>47,130 (6%)</td>
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<td>Melanoma of the skin</td>
<td>44,250 (5%)</td>
<td>Thyroid</td>
<td>43,210 (5%)</td>
</tr>
<tr>
<td>Kidney &amp; renal pelvis</td>
<td>40,250 (5%)</td>
<td>Melanoma of the skin</td>
<td>32,000 (4%)</td>
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<tr>
<td>Non-Hodgkin lymphoma</td>
<td>38,160 (4%)</td>
<td>Non-Hodgkin lymphoma</td>
<td>31,970 (4%)</td>
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<tr>
<td>Oral cavity &amp; pharynx</td>
<td>28,540 (3%)</td>
<td>Kidney &amp; renal pelvis</td>
<td>24,520 (3%)</td>
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<tr>
<td>Leukemia</td>
<td>26,830 (3%)</td>
<td>Ovary</td>
<td>22,280 (3%)</td>
</tr>
<tr>
<td>Pancreas</td>
<td>22,090 (3%)</td>
<td>Pancreas</td>
<td>21,830 (3%)</td>
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<tr>
<td>All sites</td>
<td>848,170 (100%)</td>
<td>All sites</td>
<td>790,740 (100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Male</th>
<th>2012 Estimates</th>
<th>Female</th>
<th>2012 Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung &amp; bronchus</td>
<td>87,750 (29%)</td>
<td>Breast</td>
<td>72,590 (26%)</td>
</tr>
<tr>
<td>Prostate</td>
<td>28,170 (9%)</td>
<td>Lung &amp; bronchus</td>
<td>25,220 (9%)</td>
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<tr>
<td>Colon &amp; rectum</td>
<td>26,470 (9%)</td>
<td>Colon &amp; rectum</td>
<td>18,850 (6%)</td>
</tr>
<tr>
<td>Pancreas</td>
<td>18,850 (6%)</td>
<td>Liver &amp; intrahepatic bile duct</td>
<td>13,980 (5%)</td>
</tr>
<tr>
<td>Leukemia</td>
<td>13,500 (4%)</td>
<td>Esophagus</td>
<td>12,040 (4%)</td>
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<tr>
<td>Non-Hodgkin lymphoma</td>
<td>8,620 (3%)</td>
<td>Urinary bladder</td>
<td>10,510 (3%)</td>
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<tr>
<td>Kidney &amp; renal pelvis</td>
<td>8,650 (3%)</td>
<td>Non-Hodgkin lymphoma</td>
<td>10,320 (3%)</td>
</tr>
<tr>
<td>Brain &amp; other nervous system</td>
<td>5,980 (2%)</td>
<td>Liver &amp; intrahepatic bile duct</td>
<td>6,570 (2%)</td>
</tr>
<tr>
<td>All sites</td>
<td>301,820 (100%)</td>
<td>All sites</td>
<td>275,370 (100%)</td>
</tr>
</tbody>
</table>

*Excludes basal and squamous cell skin cancers and in situ carcinoma except urinary bladder.

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Figure 2. Incidence Rates by Stage at Diagnosis for Cancers with Increasing Trends, Ages 15 years and older, 1999-2008.

A. HPV-related oropharynx
B. Esophageal adenocarcinoma
C. Pancreas
D. Liver and intrahepatic bile duct
E. Thyroid
F. Kidney and renal pelvis
G. Melanoma of the skin


Note: The scale of the y-axis differs between cancer sites and genders. The rates are age-adjusted to the 2000 US standard population. Note the scale of the y-axis differs between cancer sites and genders. Trends in incidence rates by stage at diagnosis should be interpreted with caution because of the introduction of Collaborative Staging Staging in 2004, which may have impacted the stage distribution for some cancers.
Annual Number of Cancer Deaths Attributable to Smoking by Sex and Site, US, 2000-2004


American Cancer Society, Surveillance Research, 2012
Geographic Patterns in Lung Cancer Death Rates* by State, US, 2004-2008

*Age adjusted to the 2000 US standard population.
Source: US Mortality Data, National Center for Health Statistics, Centers for Disease Control and Prevention.

American Cancer Society, Surveillance Research, 2012
## Screening Guidelines for the Early Detection of Cancer in Average-risk Asymptomatic People

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Population</th>
<th>Test or Procedure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>Women, age 20+</td>
<td>Breast self-examination (BSE)</td>
<td>It is acceptable for women to choose not to do BSE or to do BSE regularly (monthly) or irregularly. Beginning in their early 20s, women should be told about the benefits and limitations of breast self-examination (BSE). Whether a woman ever performs BSE, the importance of prompt reporting of any new breast symptoms to a health professional should be emphasized. Women who choose to do BSE should receive instruction and have their technique reviewed on the occasion of a periodic health examination.</td>
</tr>
<tr>
<td></td>
<td>Clinical breast examination (CBE)</td>
<td></td>
<td>For women in their 20s and 30s, it is recommended that clinical breast examination (CBE) be part of a periodic health examination, preferably at least every three years. Asymptomatic women age 40 and older should continue to receive a clinical breast examination as part of a periodic health examination, preferably annually.</td>
</tr>
<tr>
<td></td>
<td>Mammography</td>
<td>Begin annual mammography at age 40.*</td>
<td></td>
</tr>
<tr>
<td>Cervix</td>
<td>Women, age 21+</td>
<td>Pap test Pap test</td>
<td>Cervical cancer screening should begin approximately three years after a woman begins having vaginal intercourse, but no later than 21 years of age. Screening should be done every year with conventional Pap tests or every two years using liquid-based Pap tests. At or after age 30, women who have had three normal test results in a row may undergo screening every two to three years with cervical cytology (either conventional or liquid-based Pap test) alone, or every three years with an HPV DNA test plus cervical cytology. Women 70 years of age and older who have had three or more normal Pap tests and no abnormal Pap tests in the past 10 years and women who have had a total hysterectomy may choose to stop cervical cancer screening.</td>
</tr>
<tr>
<td></td>
<td>Stool DNA test, or</td>
<td>Interval uncertain, starting at age 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flexible sigmoidoscopy (FSG), or</td>
<td>Every 5 years, starting at age 50. FSIG can be performed alone, or consideration can be given to combining FSIG performed every 5 years with a highly sensitive gFOBT or FIT performed annually.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Double contrast barium enema (DCBE), or</td>
<td>Every 5 years, starting at age 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colonoscopy</td>
<td>Every 10 years, starting at age 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CT Colonography</td>
<td>Every 5 years, starting at age 50</td>
<td></td>
</tr>
<tr>
<td>Colorectal</td>
<td>Men and women, age 50+</td>
<td>Fecal occult blood test (FOBT) with at least 50% test sensitivity for cancer, or fecal immunochemical test (FIT) with at least 50% test sensitivity for cancer, or</td>
<td>Annual, starting at age 50. Testing at home with adherence to manufacturer’s recommendation for collection techniques and number of samples is recommended. FOBT with the single stool sample collected on the clinic’s a fingertip during a digital rectal examination in the health care setting is not recommended. Guaiac based toilet bowl FOBT tests also are not recommended. In comparison with guaiac-based tests for the detection of occult blood, immunochemical tests are more patient-friendly, and are likely to be equally or better in sensitivity and specificity. There is no justification for repeating FOBT in response to an initial positive finding.</td>
</tr>
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<td>CT Colonography</td>
<td>Every 5 years, starting at age 50</td>
<td></td>
</tr>
<tr>
<td>Endometrial</td>
<td>Women, at menopause</td>
<td>At the time of menopause, women at average risk should be informed about risks and symptoms of endometrial cancer and strongly encouraged to report any unexpected bleeding or spotting to their physicians.</td>
<td></td>
</tr>
<tr>
<td>Prostate</td>
<td>Men, age 50+</td>
<td>Digital rectal examination (DRE) and prostate-specific antigen test (PSA)</td>
<td>Men who have at least a 10-year life expectancy should have an opportunity to make an informed decision with their health care provider about whether to be screened for prostate cancer, after receiving information about the potential benefits, risks, and uncertainties associated with prostate cancer screening. Prostate cancer screening should not occur without an informed decision-making process.</td>
</tr>
<tr>
<td>Cancer-related checkup</td>
<td>Men and women, age 20+</td>
<td>On the occasion of a periodic health examination, the cancer-related checkup should include examination for cancers of the thyroid, testicles, ovaries, lymph nodes, oral cavity, and skin, as well as health counseling about tobacco, sun exposure, diet and nutrition, risk factors, sexual practices, and environmental and occupational exposures.</td>
<td></td>
</tr>
</tbody>
</table>

*Beginning at age 40, annual clinical breast examination should be performed prior to mammography.

†New recommendations will be released in early 2012, please refer to cancer.org for the most current guidelines.

**Note:** Screening recommendations for lung cancer will be released in 2012; please refer to cancer.org for the most current information.