It has been demonstrated that cancer has a significant impact on the health, quality of life, and social well-being of the military community. Concurrently, because of the nature of military way of life, the military health system has unique resources that can be used to address research questions. These provide excellent specimens and data for research important for DoD and extraordinary scientific advances for the common good. As the DoD CoE for Cancer, the Murtha Cancer Center with the unflagging support from DoD leadership and strong relationships with USU, WRB, VA, NCI, and civilian Comprehensive Cancer Centers has been able to begin to meet ASD(HA)’s expectations and value propositions for a DoD Center of Excellence. It has become apparent that a military Cancer CoE is the most relevant effective entity to address clinical and research questions on cancer among the DoD beneficiaries. With continued support, the MCC intends to build a MHS Cancer Referral, Treatment, and Clinical Trials Network where consolidated complex cancer care and research is effectively and efficiently integrated throughout the MHS enterprise.
2016 HIGHLIGHTS

- USU Chartered the MCC as a program within the combined Department of Surgery and the USUHS and the WRNMMC. The MCC is an integral part of the USU School of Medicine and Surgery Department as well as the Chief of Staff Office at WRNMMC, with goals of improving overall translational cancer research and treatment to active duty and all eligible beneficiaries.
- Co-Sponsored the USU 2016 Military Woman’s Health Conference
- Four Military Treatment Facilities added to the MCC Military Clinical Trials Network to develop, test, and evaluate ways to increase effectiveness and efficiencies of integrated cancer support for the MHS. This pilot supports an initiative to establish a MHS Cancer Referral, Treatment, and Clinical Trials Network that consolidates complex cancer care throughout the MHS enterprise. This performance measure supports MHS Strategic Plan Strategies PLS4, IP4, OC2, OCS and F1.

Key Military Treatment Facilities
- Walter Reed National Military Medical Center, Bethesda, MD
- Naval Medical Center Portsmouth, VA
- Womack Army Medical Center, Fort Bragg, NC
- Keesler Medical Center, Keesler AFB, Biloxi, MS
- Naval Medical Center San Diego, CA

- Developing capabilities-based assessment report to document the research and development capability shortfalls in providing Cancer Care capabilities across the Joint Force.
- Co-Sponsored the USU 2016 Military Woman’s Health Conference
- Four Military Treatment Facilities added to the MCC Military Clinical Trials Network to develop, test, and evaluate ways to increase effectiveness and efficiencies of integrated cancer support for the MHS. This pilot supports an initiative to establish a MHS Cancer Referral, Treatment, and Clinical Trials Network that consolidates complex cancer care throughout the MHS enterprise. This performance measure supports MHS Strategic Plan Strategies PLS4, IP4, OC2, OCS and F1.

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- The Deputy Assistant Secretary of Defense, Health Readiness Policy & Oversight (DASD [HRP&O]) developed Capabilities-Based Assessment Report to document the research and development capability shortfalls in providing Cancer Care capabilities across the Joint Force.
- Coordinating oncology research studies with Special Operations Command Surgeon
- Established Congressionally-directed federal Task Force to focus on research for metastasized cancer with a focus on clinical and translational research aimed at extending lives of advanced state and recurrent patients.
- MCC Biobank and Biorepository accredited by the College of American Pathologists
- Awarded 92 physicians, residents and students CMC credits from MCC sponsored seminars – 64 MCC-WRB staff and 28 at other MTFs via teleconferencing.
- Initiated the Tri-Federal Cancer Initiative to optimize federal cancer resources, enhance cancer research and discoveries, decrease duplication, leverage technologies, enhance intellectual capital, and increase educational and training opportunities. This performance measure supports MHS Strategic Plan Strategies PLS5, IP3, IP4, IP7, OCS, and F1.
- Developed key telehealth, bioinformatics, and ‘omics’ technologies thru in-house resources and strategic partnerships with VA, NCI, USU, industry, and academia. This performance measure supports MHS Strategic Plan Strategies PLS1, PLS3, PLS4, IP3, IP4, IP6, and OC2.

- The APOLLO network will drive the process of discovery as a natural outgrowth of patient care, establish an adaptive learning healthcare system, and help transform the way evidence on clinical effectiveness is generated and used to improve health and health care for active military, dependents, veterans, and civilians.
- The DoD ‘Framingham’ Project will employ proteogenomic signature analysis to examine the data and specimens housed in DoD’s JPC cancer registry, ACTUR, and serum repository, DHA AFHSB, to identify new linkages between pre- and post-diagnostic biological markers and various types of cancer. DoD and the EPA will also work to link results with the “Environmental Quality Index” to further evaluate the environmental factors contributing to this disease.
- Through HJF the MCC has joined the ORIEN Network, consisting of 15 NCI-designated Comprehensive Cancer Centers, that is building a national cancer data base. Through data analysis and sharing, ORIEN will provide physicians evidence of the best therapeutic options, including clinical trial treatments, specific to a patient’s biological and epidemiological profile, increasing the likelihood of treatment efficacy, speeding response time, and potentially minimizing side effects while improving outcomes.
- The MCC telegenetics project will focus on individuals with an inherited susceptibility to cancer and will be designed to assess diagnostic accuracy, impact of service delivery on patient outcomes as well as confidence and satisfaction of telegenetic encounters(s) by healthcare providers, patients and their families. The format will be evaluated as a method to increase military access to cancer genetics services and decrease costs by using a telemedicine model. The objective is to apply these technologies to the assessment of disease risk, understanding of disease mechanisms, and prediction of optimal therapies that will increase Return to Duty thru early diagnosis and treatment.

MISSION/VISION

MISSION: The MCC strives to improve the diagnosis and multidisciplinary treatment of Military Health system (MHS) cancer patients through innovative clinical care, research, and education. Using professional and community outreach, education, and prevention services we enhance the readiness of the military, its families, and beneficiaries. We optimally integrate the unique resources of the Department of Defense leveraged with federal partners to enhance care for our patient population.

VISION: As the only DoD Cancer Center of Excellence the Murtha Cancer Center (MCC) will lead the MHS mission to fight cancer. Our vision is to operate a world class Cancer Center conducting innovative state-of-the-art clinical care and research for the military and its beneficiaries. We will partner with the enhanced Multi-Service Markets (eMSM), Military Treatment Facilities (MTF) and across federal agencies to harness our combined intellectual prowess and resources for the benefit of our patients and the wider public health and welfare.
BACKGROUND and ENVIRONMENT

The MCC is a joint-service, multidisciplinary, fully integrated, patient-centric care delivery system and translational cancer research center chartered by USU the MCC as a program within the combined Department of Surgery and the Uniformed Services University of the Health Sciences (USU) and the Walter Reed National Military Medical Center (WRB). The MCC is an integral part of the USU School of Medicine and Surgery Department as well as the Chief of Staff Office at WRNMMC, with goals of improving overall translational cancer research and treatment to active duty and all eligible beneficiaries. It was created in full compliance with Congressional, DoD, and Commander Joint Task Force CAPMED intent and direction. BRAC 2005 resulted in the creation of a 85,391 square foot cancer center with an additional 43,312 square feet of translational research space off campus. It has over 273 military, civilian and contract personnel and is fully matrixed and integrated within WRB operations.

The foundations of the MCC are the accumulated legacies and nationally-recognized expertise, care delivery, and research of eighteen core oncology services and three translational oncology research centers. Taken individually, each of these foundational oncology programs are nationally-recognized and directed by DoD-recognized leaders in their respective fields of cancer treatment and research. Under the organizational construct of the MCC, its leadership Council has created a one-of-a-kind cancer organization within the DoD MHS.

The MCC has been designated as the Defense Center of Excellence for Cancer by the ASD (HA) Centers of Excellence Oversight Board. As such, the MCC is developing robust translational military cancer research programs and public and private partnerships to accelerate progress against cancer, becoming a complex case cancer referral center for the MHS developing cancer evidence-based practices for the MHS based on research and civilian and NCI guidelines, supporting cancer outreach health promotion and disease prevention initiatives, and serving as a cancer epidemiology and population sciences center.

Additionally, the MCC has facilitated the formation of the “Tri-Federal Cancer Initiative” with WRB, USU and the National Cancer Institute (NCI) to optimize federal cancer resources, enhance cancer research and discoveries, decrease duplication, leverage technologies, enhance intellectual capital, and increase educational and training opportunities. The MCC also has joined in the WRB/USU Unity of Effort as the cancer element of “America’s Health Campus,” a patient-focused collaboration between WRB and USU that sets the standard for quality, research, education and military readiness in the MHS. These efforts are taken to assure that all DoD beneficiaries will have access to best possible cancer care available.

MCC STRATEGIC GOALS and OBJECTIVES

1. Goal: As the only DoD Cancer Center of Excellence integrate MHS oncology specialist communities to develop common cancer care pathways and translational research projects that will lead to better outcomes throughout the MHS. PLS2, PLS3, PLS4, IP3, IP4, IP6

a. Objectives:
1) Imbed MCC oncology Research Coordinators in the Naval Medical Center (NMCP) Fort Bragg, SC, Naval Medical Center San Diego (NMCSD), CA and other MHS activities to coordinate clinical and research collaborations between them the MCC and NCI.
2) Obtain resources to pilot MHS Telegenetics Consultation Program at WAMC and other MTFs.
3) Increase patient and provider outreach and include MTFs in CME training and education via distributed learning technologies.
4) Increase efforts to develop an Adolescent and Young Adult program that will address cancer-related challenges in the 20 – 39 year old population.
2. Goal: Through the Tri-Federal Cancer Initiative and the WRB/USU Unity of Effort create the environment to make all federal cancer resources available to DoD healthcare beneficiaries. PLS5, IP3, IP4, IP8

a. Objectives:
1) 50/50 Sharing of tissues from the MCC Biobank with NCI – Establish overarching regulatory agreements to enable specimen transfers and data sharing.
2) Continue to share WRB and NCI providers to fill clinical and gaps, to provide increased quality of care and increase training in critical oncology care – Identify needs and expedite credentialing processes.
3) Continue to allow the exchange of non-DoD cancer patients from NCI via Secretarial Designation to receive care at WRB and WRB patients to receive care at NCI to increase the quality and scope of cancer care and oncology training.
4) Work with NCI to make cancer clinical trials accessible to more MTF providers and beneficiaries.
5) Increase collaborations with USU’s The American Genome Center (TAGC) and the USU/NHLBI Collaborative Health Initiative Research Program (CHIRP) program to enhance genomics research and patient care.

3. Goal: Advance MCC collaborative translational militarily-relevant cancer research efforts. PLS1, PLS3, PLS4, IP3, IP7, OC1

a. Objectives
1) Participate in the POTUS Moon Shot Initiative to accelerate the pace of discovery in cancer and translate the findings to clinical care. Using state-of-the-art methods on proteogenomics develop a deeper understanding of cancer biology, identify potential therapeutic targets, and identify pathways of cancer detection and intervention.
2) Facilitate increased NCI/WRB joint research Activation Funding.
3) Initiate USU/MCC Intramural Research Collaborations.
4) Continue Smokeless Tobacco Research Project – MCC/Postgraduate Dental College and WAMC.
5) Develop and direct a Congressionally-directed Metastatic Cancer Task Force that will prepare a report a report to Congress on clinical and translational research aimed at extending the lives of advanced state and recurrent patients.
6) Host Cancer Research Seminar, Melanoma Summit and Awareness Day and Lung Cancer Research Summit – Offer CMEs to other MTFs via teleconferencing.

MCC TOP THREE PRIORITIES

1. Increase readiness by addressing unmet cancer needs of the Active Duty forces focused on early detection and cancer genetics. This priority is consistent with the MHS Quadruple Aim and the MCC efforts to increase the opportunity to return duty through early diagnosis and treatment. These approaches will advance our efforts to practice individualized medicine.

2. Through the Tri-Federal Cancer Initiative and other key collaborations assist all MHS beneficiaries gain access to better cancer care at a decreased cost. The advantages of combining the cancer resources of WRB, MCC, USU and NCI include:
   a. Leveraged efficiencies through combining common support functions
   b. Provision of MCC-funded personnel research support to MTF investigators,
   c. Increased access for beneficiaries to advanced MCC/NCI clinical trials
   d. Decreased MTF purchased care costs by enabling those rare and/or complex cancer cases to be kept in direct care system: transfer to WRB for MCC/NCI.

3. Continue to expand military or specific cancer research programs to advance the successes of our existing research programs. The MCC has demonstrated better Lung and Breast Cancer survival rates than the national average. Our intention is to apply these research results and practices to other militarily relevant cancers, monitor and document these results and adopt these findings to Evidence-based Practice Guidelines for the MHS. These priorities align with the MHS vision of developing a continuum of preventive and curative cancer services to eligible beneficiaries which is accountable for health outcomes and cost. They also adhere to the basic tenets of the Quadruple Aim. The priorities support the Four Strategic Themes (Notes in the parentheses correspond to the MHS Strategic Objectives):

1. Readiness – Early cancer diagnosis and individualized precision medicine lead to quicker and complete recovery and return to duty (PLS1, PLS2, PLS4). We will do this by incorporating telehealth and ‘omics’ technologies (IP3) and through new strategic Partnerships with NCI, VA and USU (IP4).

2. Better Health – MCC better cancer survival rates are, to a great extent, dependent on the approach to cancer care which is oriented around a specific cancer, integrated multidisciplinary panels at the time of diagnosis and throughout the cancer journey, enriched with advanced clinical trials (IP7). This approach also requires patient and provider education and training which are achieved through outreach programs and CMEs (PLS2, PLS4, IP5).

3. Better Care – The multidisciplinary approach incorporated in most of our disease site based clinics that has lead to increased survival rates in two of our specialties is patient based and strives to meet the ‘one-stop’ expectations of our beneficiaries (PLS4).

4. Lower cost – A great deal of our efforts stress the need to effectively and efficiently address our clinical and research requirements in a cost-effective manner. Our new strong key collaborations with NIH, NCI, USU, VA, and other MTFs will optimize the alignment of personnel, equipment and supplies and intellectual capital in a way that we can best meet our vision and mission (OC2).
The MCC overarching theme is to address cancer in the military through the MHS guiding strategic framework: Quadruple Aim.

1. Readiness – “Medically Ready Force, Ready Medical Force”
   a. Ready Medical Force – Peacetime training requires a complex medical platform for real-life medicine and surgery for all healthcare specialties. WRB/MCC serves as a readiness and skills sustainment platform. A variety of complex cases during peacetime is critical to maintaining wartime skills. Cancer Services are the centerpiece of this requirement for continuous training for a Ready Medical Force.
   b. Medically Ready Force – Individual readiness: Cancer prevention – screening – treatment – return to duty. Cancer Services are a barometer of excellence across any healthcare organization, as much of all care rendered in any medical center is for some aspect of cancer care (prevention; screening; treatment; survivorship; end-of-life).

2. Better Health – MCC has proven data showing Better Outcomes for certain cancers treated in our center, versus civilian centers.
   a. Lung Cancer – better survival at MCC (15% improved chance of cure versus civilian)
   b. Breast Cancer – better survival at MCC (20% improved chance of cure versus civilian)
   c. All other cancers at least equivalent outcomes.
   d. MCC Genetics Program at MCC is one-of-a-kind in MHS and provides earliest identification possible for active duty and beneficiaries of potential cancer risks, as well as offering prevention options. The MCC Telegenetics Service is beginning to reach out to other MTFs through telegenetics consults.
   e. MCC research programs are focused on the Military Cancer Problem.

3. Better Care – All large healthcare systems (MEDSTAR Georgetown; Kaiser; Hopkins; Mayo; U Penn) have a designated Cancer CoE to achieve highly complex, high quality care. This provides value because outcomes are better and cost is less.
   a. DoD is the second largest health care organization in the world and MCC is preparing to be the referral cancer center for these cases.
   b. MCC provides SMEs and advice to DHA for cancer policies and reimbursement standards applicable to the entire MHS. Better Care across the enterprise as a result.

4. Lower Cost
   a. Studies have shown cost savings of 30-40% over Purchased Care for all cancers treated at MCC/WRRMMC.
   b. Tri-Federal Cancer Initiative = MCC(USU/WRB) + NCI – With the patient at the center of all we do: Optimize federal cancer resources, enhance cancer research and discoveries, decrease duplication, leverage technologies and intellectual capital, increase education and training opportunities.
   c. All other cancers at least equivalent outcomes.
   d. MCC Genetics Program at MCC is one-of-a-kind in MHS and provides earliest identification possible for active duty and beneficiaries of potential cancer risks, as well as offering prevention options. The MCC Telegenetics Service is beginning to reach out to other MTFs through telegenetics consults.
   e. MCC research programs are focused on the Military Cancer Problem.
Tri-Federal Cancer Initiative Implement the Tri-Federal Cancer Initiative to optimize federal cancer resources, enhance cancer research and discoveries, decrease duplication, leverage technologies, enhance intellectual capital, and increase educational and training opportunities. This performance measure supports MHS strategies PL55, IP3, IP4, IP7, OC5, and F1 and USU Domain and Enabling Tasks: E2, W4, WS, W7, M1, M3.

Background/Objective:
A recent breakthrough in strategic relationships between WRNMMC, NCI, and USU forming the Tri-Federal Cancer Alliance has presented the opportunity to increase personalized cancer care for DoD beneficiaries, optimize federal cancer resources, enhance cancer research and discovery, and increase education and training opportunities for patients and oncology clinicians and researchers.

New Undersecretary of Defense (Personnel and Readiness) (USD(P&R)) policy and recent agreements between WRB, USU and NCI have created the opportunity for greater research collaborations and sharing of federal cancer resources. MCC military cancer research program has been set that emphasizes military cancer research. This performance measure is designed to optimize this new relationship and benefit the MHS.

Performance Measure Detail:
- a. Hired MCC Biobank laboratory staff in the WRB Department of Pathology to increase and improve research capabilities
- b. Incorporated WRB oncology services with the MCC
- c. Established credentialing procedures at WRB and NCI to expedite the exchange of clinical and research oncology specialists
- d. Hired research and clinical oncology navigators, clinical trials nurses, clinical oncology psychologists, and genetics counselors to support MCC programs
- e. Hired MCC Biobank laboratory staff in the WRB Department of Pathology to increase and improve research capabilities
- f. Hired research support personnel at 4 MTFs to coordinate cancer research programs across the MHS
- g. Continue to build translational research program that addresses: Women’s Malignancies; Military Population Sciences and Epidemiology; Urogenital Malignancies; and Inflammation, Infection, Immunology, and Stromal (peritumoral environment), and strong Core facilities

MCC is integrating its capabilities with other federal agencies, NIH, NCI, VA, and USU, to enhance cancer care and research throughout the MHS. These relationships will decrease costs through shared resources including personnel and facilities.

What is Success: Increased access to clinical trials, optimized federal cancer resources, increased access to translational research resources, increased access to patients/data/tissue/oncology specialists, increased education and training opportunities, and increased recruiting and retention.

Telehealth, bioinformatics, and ‘omics’ technologies Develop key telehealth, bioinformatics, and ‘omics’ technologies thru in-house resources and strategic partnerships with NCI, USU, industry, and academia. This performance measure supports MHS strategies PLS1, PLS3, PL54, IP3, IP4, IP6, and OC2 and USU Domain and Enabling Tasks: E2, W4, WS, W8, W9, M2, M3.

Background/Objective:
In accordance with the basic tenants of the Presidential Moonshot Initiative, the VA, DoD, and NCI are establishing an integrated network that will use existing and prospective samples and data, state-of-the-art proteogenomics and bioinformatics technologies, and established infrastructures to develop a deeper understanding of cancer biology and rapidly identify potential targets and pathways of cancer detection and intervention.

APOLLO
The VA, DoD, and NCI have established a Memorandum of Agreement that will enable the three agencies to accelerate the pace of discovery in cancer and translate findings into clinical care. This agreement forms the Applied Proteogenomics Organizational Learning and Outcomes (APOLLO) network to strengthen and develop research cooperation in using state-of-the-art methods in proteogenomics to characterize and compare tumors, develop a deeper understanding of cancer biology and identify potential targets and pathways of cancer detection and intervention. Efforts will initially focus on existing lung, GYN, prostate and breast cancers, but will expand to incorporate multiple cancer types, and aims to enable better testing of clinical questions on toxicity and response, sequencing and proteomics, analysis of samples and use of data science/analysis tools in the context of two national healthcare systems.

Advances in molecular profiling of patients are difficult to test and rapidly deploy in the current translational pipeline and the hand-off to determine clinical utility in large healthcare systems to obtain real world evidence is even more difficult due to current incentives (reimbursement and healthcare coverage).

The Goal is to create the nation’s first integrated proteogenomics cancer care early discovery-to-clinical healthcare implementation system that will leverage the VA Precision Oncology Program, VA hospital network, the DoD Murtha Cancer Center, NCI Clinical Proteomics Tumor Analysis Consortium (CPTAC), NCI-sponsored clinical trials network, NCI Genomic Data Commons, a new
Proteomics Data Commons, NCI SEER registry, NCI/NIH/VA/DoD training efforts, and the USU TAGC. Datasets generated will be made broadly available to enable additional analysis through open source data challenges and/or pre-competitive open public-private partnerships (e.g. IBM, Verily, etc.). The APOLLO network will drive the process of discovery as a natural outgrowth of patient care and help transform the way evidence on clinical effectiveness is generated and used to improve health and health care for active military, dependents, veterans, and civilians.

The objective is to apply these technologies to the assessment of disease risk, understanding of disease mechanisms, and prediction of optimal therapies that will increase Return to Duty thru early diagnosis and treatment.

Performance Measure Detail

a. Senior representatives from DoD, VA, and NCI and Team Leaders form four APOLLO Working Groups provide oversight to the APOLLO project. The four Working Groups, Protocol Working Group, Samples Working Group, Data Working Group, and Technology Working Group, will design and execute APOLLO subprojects 1 through 5:

APOLLO 1 – Existing Samples / Lung
APOLLO 2 – Existing Samples / GYN
APOLLO 3 – Existing Samples / Prostate
APOLLO 4 – Existing Samples / Breast
APOLLO 5 – Prospective Samples / All Organ Sites

b. Process
The Workflow Chart below depicts the overarching process for APOLLO. It begins with the collection of fully consented specimens and data from cancer patients from the DoD Active Duty members and beneficiaries, veterans enrolled in VA programs, and civilians through the NCI. These specimens and data are collected under strict research APOLLO protocols approved by Institutional Review Boards (IRB). VA veterans will co-enroll through the existing Million Veterans Program (MVP). The specimens are shipped and stored under rigid clinical and research standards. Some specimens will be sent to CLIA (Clinical Laboratory Improvement Amendment) and CAP (College of American Pathologists) approved laboratories for clinical grade sequencing for known actionable targets. Specimens for research will be sent to TAGC at the USU for whole genome level sequencing. These same specimens will also be analyzed for targets at the protein level at the MCC GYN Center of Excellence and the NCI CPTAC. All genome and protein sequencing data will be computationally processed and analyzed at bioinformatics centers.

The overall plan is to identify all DNA, RNA, and Protein molecules possible on 8,000 patients over 2 years. As molecules are discovered, they will be matched with available therapeutics and used to establish new clinical trials. All of the data will be uploaded in to the NCI Genomic Data Commons and the Proteomic Data Commons when it becomes available. Eventually, all of the data will be made available to all qualified researchers in the public domain. Because of this open source concept an adaptive learning environment will be created where the patients and the healthcare system can discover new approaches and therapeutics to conquer cancer.

Timelines

a. APOLLO 1-4: It is anticipated that APOLLO subprojects 1 through 4 will be carried out in 8 to 12 months. These subprojects rely on existing processing, testing and analyzing infrastructure; IRB approved protocols, and properly consented specimens collected, processed and stored in accordance with the highest standards.

b. APOLLO 5: Because APOLLO 5 relies mainly on prospective patient samples and data it will take longer; approximately 18 months to 2 years. It will start de novo with increased sample collection sites, patients consented under a new joint APOLLO protocol, newly acquired prospective specimens collected under the most stringent procedures that allow for the identification of new proteogenic molecules, and new bioinformatics analytic procedures that will allow for better data aggregation and promulgation for a more dynamic adaptive learning environment.

DoD ‘Framingham’ Project

The Framingham Project is a longitudinal study to transform our understanding of the biological underpinnings of cancer. The project is named after the longitudinal Framingham Heart Study where residents of Framingham, MA and their offspring have been followed for heart disease for 50 years and the results have led to remarkable advances in the prevention of coronary disease. Approximately 1,000 new cases of cancer occur annually in active duty personnel, and there are approximately 250,000 samples from the last 25 years available to undergo protein signature analysis for pre-incident cancer markers.

The DoD ‘Framingham’ Project will employ proteogenomic signature analysis to examine the vast amount of data and specimens housed in DoD’s cancer registry, ACTUR, and serum repository, DHA AFHSB, to identify new linkages between pre- and post-diagnostic biological markers and various types of cancer. DoD and the Environmental Protection Agency (EPA) will also work to link results with the “Environmental Quality Index” to further evaluate the environmental factors contributing to this disease.
**Performance Measure Detail:**

a. Pre- and post-cancer diagnosis serum specimens from the DoD Serum Repository located at the DHA Armed Forces Health Surveillance Branch will be used. The Repository contains more than 56 million serum specimens drawn from individuals serving on active duty (AD) since the late 1980s. The specimens are maintained at -25 degrees Celsius and are linked with an individual longitudinal relational database that tracks AD health-related events throughout their military careers. The serum specimens will be linked to the DoD’s Automated Central Tumor Registry (ACTUR) to identify Service members who were diagnosed with cancer while on AD back to 1990. In partnership with NCI or the Department of Energy’s Pacific Northwest National Laboratory (PNNL), mass spectroscopy will be performed to search for pre-diagnostic protein/peptide markers for each cancer under study. Artificial Intelligence and/or Bayesian Belief Networks informatics will be used to identify novel associations. Additionally, in partnership with EPA, each case will be linked to EPA’s Environmental Quality Index that provides longitudinal environmental quality data for each county in the United States along with relevant DoD occupational exposure data to identify additional novel associations.

b. The essential elements of this national research information exchange network: proven characteristics of their particular tumor.

**Timelines**

It is planned that the DoD Framingham Project will examine two cancer types per year over five years or ten cancer types. For each cancer type there will be four serum samples from 200 patients. The total number of sera to be analyzed over the five years is 8,000.

**What is Success:** Availability of predictive markers, advanced target discovery and drug development, better matched clinical trials and trial design, evidenced-base solutions for patient engagement. These six main components of the ORIEN partnership are enacted at each participating site through what is known as the ORIEN Total Cancer Care (TCC) Protocol.

**ORIEN Oncology Research Information Exchange Network**

a. Murtha Cancer Center through the Henry M. Jackson Foundation is part of the ORIEN consortium of NCI-designated Comprehensive Cancer Centers across America. ORIEN is a unique research partnership among North America’s top cancer centers that recognize collaboration and access to data are the keys to ongoing and future cancer discoveries. The six main components of the ORIEN partnership are: 1. A new kind of research protocol to benefit multiple stakeholders; 2. A common biobanking and data protocol amongst all participating centers; 3. Big Data to guide discovery and drug development; 4. A clinical trial matching service; 5. A rapid learning environment; and 6. Ongoing and continuous consented patient engagement. These six main components of the ORIEN partnership are enacted at each participating site through what is known as the ORIEN Total Cancer Care (TCC) Protocol.

b. The essential elements of this national research information exchange network: proven consent process for enrolling patients; ability to re-contact patients; patient portal for self-reported data; real time data capture at source; standardized processes across members for tissue, data, and consenting; biomarker-based pre-population of patients for clinical trials; data aggregation and linkage across members and source systems; data concierge services; informatics platform options to access and use the data.

Academic cancer centers who are part of the consortium enroll patients in a common protocol that consents patients to provide clinical data and tissue samples for analysis and agree to life-long follow-up, specifically engaging with the patient and clarifying with them at time of enrollment this unique ongoing relationship, which then empowers them and allows patients to be offered access to new future clinical trials geared to the genetic and molecular characteristics of their particular tumor.

**SIGNIFICANT PARTNERSHIPS/RELATIONSHIPS**

**WRB** – WRB is supporting the growth and development of the MCC in its role as the DoD Cancer CoE by its continuous support of the MCC as a matrixed entity, its mission and vision, and its emphasis on the overarching support of the MHS as a whole.

**USU** – On 14 January 2016, the MCC was chartered as an integral part of the USU School of Medicine and Surgery Department as well as the Chief of Staff Office at WRB, with goals of improving overall translational cancer research and treatment to active duty and all eligible beneficiaries. This is a relationship that has been strengthened by the WRB/USU Unity of Effort initiative that is leveraging the MCC translational research efforts, maximizing resource utilization and efficiencies, and increasing our education and training opportunities. The MCC is working with the USU CHIRP and TAGC programs to execute the proteogenomics assays for the APOLLO program.

**NCI** – This partnership was formalized via the Tri-Federal Cancer Initiative. The understanding is that MCC, NCI, and USU will optimize federal cancer resources, enhance cancer research and discoveries, decrease duplication, leverage technologies, enhance intellectual capital, and increase educational and training opportunities. The MCC is also working with the NCI Clinical Proteomics Tumor Analysis Consortium (CPTAC), NCI-sponsored clinical trials network, NCI Genomic Data Commons, a new Proteomics Data Commons, NCI SEER registry to analyze the specimens for the APOLLO Program.

**VA** – The MCC has started to work with the VA’s Million Veteran’s Program, the VA hospital network and the VA Office of Research and Development (ORD) to develop an adaptive learning environment created under the APOLLO program where the patients and the healthcare system can discover new approaches and therapeutics to conquer cancer. MCC support of local VA hospitals continues.

**Georgetown Lombardi Comprehensive Cancer Center** – In collaboration with the NCI, the MCC is working with Georgetown on six collaborative clinical/research programs that will leverage the resources and technologies from all three entities.

- Training Programs
- Cellular Therapy
- Clinical Trials
- Biomarker/Pathology Resource
- Dermatology
- Clinical Coverage that would provide Academic Continuity at Murtha

**Congressionally Directed Medical Research Program (CDMRP) – Review and Analysis**

On 29 March 2016, the Department of Defense (DoD) and the Department of Veterans (VA) Affairs Office of Research & Development (ORD), in conjunction with the Uniformed Services University of the Health Sciences (USUHS), Office of the Assistant Secretary of Defense (OASD), and Defense Medical Research and Development Program (DMDRP), conducted a review and analysis (R&A) of the five cancer programs supported by the CDMRP, as well as the three CoE supported by the CDMRP, as well as the three CoE supported by the CDMRP – the USU Breast Cancer CoE, USU Gynecologic Cancer CoE, and USU Prostate Cancer CoE.
In addition to providing an opportunity to review the agencies' various research portfolios and supported CoE, this meeting allowed participants to highlight research gaps being addressed by current programs, identify gaps requiring additional support, highlight current areas of collaborative success, identify additional opportunities for further collaboration and coordination, leverage resources, and avoid overlap.

Metastatic Cancer Research Task Force
Metastatic Cancer Research Tasking
“The Committee continues to support the establishment of a task force to focus on research for metastasized cancer with a focus on clinical and translational research aimed at extending the lives of advanced state and recurrent patients. The Committee directs the Assistant Secretary of Defense (Health Affairs) to submit a report to the congressional defense committee not later than 60 days after the enactment of this Act on the status of establishing such a task force.”
114th Congress House of Representatives Report 114-139, DoD Appropriations Bill 2016, pg 278

Congress directed the Assistant Secretary of Defense for Health Affairs (ASD(HA)) to submit a report regarding the status of research on cancer metastasis with a focus on clinical and translational research aimed at extending the lives of advanced state and recurrent patients.” The MCC, the Department of Defense (DoD) Cancer Center of Excellence, has been directed by the ASD (HA), through the USU, to create a federal Metastatic Cancer Research Task Force that will bring together experts in metastatic disease from the military and civilian healthcare communities to discuss research and innovations aimed at extending the lives of advanced state and recurrent cancer patients. The Task Force will prepare a report to advise Congress as to what steps are required to accelerate our understanding of metastatic cancer and advance research into its prevention, early detection, treatment, and cure.

The Task Force is holding a Testimony/Operational Meeting to achieve this directive. The objective of the meeting is two-fold. The first objective is to bring together military and civilian cancer experts in an open, publicly accessible forum to present findings and discussions regarding innovations in metastatic cancer care. The second objective is to facilitate the development of a state-of-the-science report to Congress on cancer metastasis and associated clinical and translational research aimed at extending the life of patients with metastatic cancer.

Testimony and Operational Meeting
Date: 12-13 December 2016
Venue: Booz Allen McLean Campus
Tysons Corner, VA

Participants:
- 16 Metastatic Research TF Members – DoD, NCI, USU, CDMRP
- 28 Metastatic Cancer Experts
- Senior DoD, NCI, USU, CDMRP leaders
- Cancer patient advocate groups

MCC/HJF/NCI-designated Comprehensive Cancer Centers
MCC has partnered with HJF and NCI-designated Comprehensive Cancer Centers to form ORIEN which is a unique research partnership among North America’s top cancer centers that recognize collaboration and access to data are the keys to ongoing and future cancer discoveries.

MCC/USU/NCI/DoD MTFs – Smokeless Tobacco Research Study
The MCC has partnered with NCI, USU, and selected DoD MTFs in a two-phase Smokeless Tobacco Research Study. Studies have found that smokeless tobacco can cause oral cancer, esophageal cancer, and pancreatic cancer. This study has been undertaken to determine the extent of smokeless tobacco use in a selected military population and how its use is related to cancer.

Phase I – MCC/USU/Ft Bragg/Lackland AFB – An extensive epidemiologic/demographic Smokeless Tobacco Research Study.

The purpose of the study is to investigate the patterns of smokeless tobacco use in selected Army and Air Force installations and factors related to its initiation and continued use in the study population. Specifically, this pilot study aims to:

a. Investigate the use of smokeless tobacco as well as other tobacco products among study participants from two military installations. The initiation, frequency, intensity, and duration of smokeless tobacco use by demographic characteristics and their relationship to the use of other tobacco products will be assessed.

b. Investigate factors that may be associated with smokeless tobacco use in the study populations, which include military environment, beliefs towards tobacco use in the military, family history of tobacco use, intention and readiness-to-quit.

c. Assess the feasibility of conducting a large-scale cohort study among active duty service members by evaluating their willingness to participate in such a study that would follow them for many years.

Phase II – MCC/USU/NCI/Ft Bragg – Phase II will investigate associations of smokeless and cigarette tobacco with early proteogenomic markers of oral and other cancers and other diseases.