

2018 FARGO CANCER COMMITTEE ANNUAL REPORT



Grand Opening of Infusion Center Expansion

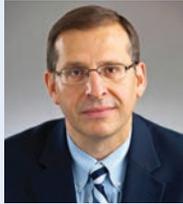
SANFORD[®]
ROGER MARIS
CANCER CENTER

820 4th Street North, Fargo, ND 58122

ROGER MARIS CANCER CENTER MEDICAL PROVIDERS



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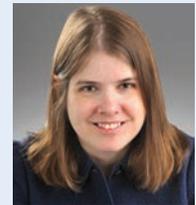
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Neurosurgeon



Dr. Adam Jackson, MD
Neurosurgeon



Dr. Tong Yang, MD
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Roger Maris Cancer Center recognizes, Dr. Chery Hysjulien, Dr. Melanie Chihak, Dr. Adam Jackson, Dr. Anu Gaba, Dr. Miran Blanchard, Dr. Tong Yang, Dr. Mark Gitau, Dr. Samuel Anim, Cheryl Smith, Dr. Susan Wood, Marit Lervik, Rebecca Renfrew for their content contributions.

Team of Experts

Medical Oncologists/ Hematologists	Pharmacists
Radiation Oncologists	Pharmacy Technicians
Pediatric Oncologists	Pharmacy Interns
Palliative Care Board Certified Physicians	Pharmacy Patient Access Specialist
Oncology Clinical Psychologist	Radiation Therapists
Senior Behavioral Health Counselor	Radiation Oncology Medical Physicists
Medical Geneticist	Medical Dosimetrists; Dosimetry Assistant
Genetic Counselors	Radiation Simulation Therapists
Doctor of Nursing Practice	Social Workers
Clinical Nurse Specialists	Cancer Registrars
Nurse Practitioners	Massage Therapists
Physician Assistants	Art Specialist
Oncology Nurse Navigators	Integrative Care Educator
Nurses	Staff Members in Administrative, Office & Supportive Care Roles

Expertise

Comprehensive Care Provided	Spiritual Care
25-Bed Inpatient Oncology Unit	Financial Services
12-Bed Palliative Care Unit	Massage Therapy
Infusion Center	Art Specialist
Hemophilia/thrombosis Care	Integrative Care
Point of Care Testing Lab	Cancer Survivorship
Pharmacy	Patient and Family Education
Nutrition Services	Clinical Research
Psycho-oncology Services	Bedside Palliative Care Program
	Cancer Registry

SANFORD ROGER MARIS CANCER CENTER YEAR IN REVIEW

By Dr. Mark Gitau, Medical Oncologist and Cancer Committee Chair

Thank you for taking the time to read the 2018 edition of the Sanford Roger Maris Cancer Center (RMCC) cancer committee annual report where we highlight our cancer services and the impact we've made in our communities.

The Sanford Medical Center Fargo Cancer Committee continues to identify areas that may benefit from improvements to maintain quality services provided to our patients and their families. The committee meets monthly to ensure we reach our goal for the best patient experience and care. The physicians and other staff constantly keep up with new developments in the medical field through attendance at conferences, online education and on-site education.

I am proud to report that our cancer center achieved re-accreditation by the Commission on Cancer (CoC) and the National Accreditation Program for Breast Centers (NAPBC) this year. We have had CoC accreditation since 1940.

Other achievements include completing an expansion, which will allow more space for clinic visits and infusions. We also have provided many women the opportunity to participate in research through the Women Informed to Screen Depending On Measures of risk (WISDOM) trial. The WISDOM trial seeks answers about the right way to screen women for breast cancer.

Our 2018 report focuses on neuro-oncology, which comprises cancers of the central nervous system (CNS). This category includes tumors involving the meninges, brain, spinal cord and cranial nerves. At Sanford/RMCC, we have a structure that fosters collaborative, multidisciplinary management of this complex cancer.

The neuro-oncology oversight committee comprises a multi-disciplinary team of clinicians who provide expertise in neuro-ophthalmology, neurosurgery, radiology, psychiatry, medical oncology, radiation

oncology, pathology and a neuro-oncology patient navigator. The committee meets once a month to set goals aimed at achieving and maintaining excellence in patient care.

We also have a monthly multidisciplinary neuro-oncology tumor board conference, usually attended by the disciplines who care for patients with neurological tumors. The tumor board provides an opportunity for clinicians to discuss the optimal treatment based on published data and clinical trials.

Our cancer center is one of more than 600 cancer centers in the U.S. with physicians certified to prescribe Novocure's Optune® TTF therapy to newly diagnosed and recurrent glioblastoma (GBM) patients.

The cancer committee focused its 2017 Sanford Annual Cancer Symposium on neuro-oncology. The conference took place on October 26-27, 2017 with goals to advance the knowledge and competence of health care professionals related to the care of patients with neurological cancers.

In 2017, 109 patients were diagnosed with tumors of the central nervous system at the Roger Maris Cancer Center. Of these, a total of 31 cases were malignant tumors, the remainder being benign. Among the patients diagnosed with malignant tumors, 27 were recorded in the tumor registry as brain tumors, while 4 were tumors of the cranial nerves and other nervous systems.

The Sanford Medical Center Cancer Committee strives to continuously provide quality comprehensive cancer care programs for our patients and their families by always integrating new, multidisciplinary and advanced approaches. We are thankful for the opportunity to care for people in our community and beyond.



OUR TEAM & COMMITMENT TO ACCREDITED CARE

Accreditation by the Commission on Cancer allows us to evaluate our quality of care according to evidence-based practice standards.

Based on the Sanford Fargo patient data submitted to the National Cancer Database (NCDB), we are able to compare our practice both with these standards and to other cancer centers across the country. The Cancer Program Practice Profile Report (CP³R) from the Commission on Cancer (CoC), is issued each year and includes three types of measures covering ten cancer types based on the most recent cancer registry data submission to the National Cancer Database (NCDB). The Accountability measures assess compliance with best practices, for which there are high levels of evidence that they make a difference in how well that group of patients will do. The Quality Improvement measures monitor the need for quality improvement within the organization. Surveillance measures are used to monitor patterns or trends of care and do not have compliance targets to reach. Nine of the twenty-three measures have a target, the expected performance rate (EPR), set by the CoC, which accredited programs are expected to meet or exceed. For measures which have few cases to evaluate, the statistical confidence interval related to the EPR is used to measure compliance.

Most recently, the CoC released CP³R data for the year 2015. The cancer registry software has created data filters that match the CoC's exclusion criteria to identify cases that are eligible for each measure. The following table shows data from 2014 – 2017, from each of the nine Accountability and Quality Improvement measures with expected EPRs. Estimated performance rates of years 2014 and 2015 were provided by the CoC's CP³R, while years 2016 and 2017 are estimates from the cancer registry software. The only measure that did not appear to meet the expected EPR was the Quality Improvement gastric cancer measure. Reviewing the CP³R for that measure in 2014 and 2015 showed the upper confidence interval to be 99% and 100%, respectively. This is well above the 80% expected EPR.



CP³R ACCOUNTABILITY AND QUALITY IMPROVEMENT MEASURES

Sanford Fargo Cancer Program Practice Profile Reports (CP³R)
Estimated Performance Rates (%)

MEASURE DESCRIPTION	MEASURE	Expected EPR	2011	2012	2013	2014	2015	2016	2017
BREAST									
(NQF #219) Radiation therapy is administered within 1 year (365 days) days of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer. (Accountability)	BCSRT	90%	95.70%	98.40%	98.50%	98.80%	96.90%	100%	96.30%
(NQF #0220) Tamoxifen or third generation aromatase inhibitor is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0, or IB - III hormone receptor-positive breast cancer. (Accountability)	HT	90%	97.90%	97.90%	99%	98%	97.60%	99.20%	99.20%
Radiation therapy is recommended or administered following any mastectomy within 1 year (365 days) of diagnosis of breast cancer for women with ≥ 4 positive regional lymph nodes. (Accountability)	MASTRT	90%	83.30%	100%	100%	100%	100%	100%	100%
Image or palpation-guided needle biopsy to the primary site is performed to establish diagnosis of breast cancer. (Quality Improvement)	nBx	80%	95.40%	94.00%	96.90%	99.50%	100%	96.50%	96.40%
COLON									
(NQF #0225) At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer. (Quality Improvement)	12RLN	85%	92.70%	87.30%	83.90%	85.70%	92.60%	94.20%	97.67%
GASTRIC									
At least 15 regional lymph nodes are removed and pathologically examined for resected gastric cancer. (Quality Improvement)	G15RLN	80%	0%	66.70%	66.70%	50%	50%	25%	0%
NON-SMALL CELL LUNG									
Systemic chemotherapy is administered within 4 months to day preoperatively or day of surgery to 6 months postoperatively, or it is recommended for surgically resected cases with pathologic, lymph node-positive (pN1) and (pN2) NSCLC. (Quality Improvement)	LCT	85%	100%	100%	100%	100%	100%	100%	100%
Surgery is not the first course of treatment for cN2, M0 lung cases. (Quality Improvement)	LNoSurg	85%	100%	100%	95%	100%	100%	100%	94.12%
RECTUM									
Preoperative chemo and radiation are administered for clinical AJCC T3N0, T4N0 or Stage III; or Postoperative chemo and radiation are administered within 180 days of diagnosis for clinical AJCC T1-2N0 with pathologic AJCC T3N0, T4N0, or Stage III; or treatment is recommended; for patients under the age of 80 receiving resection for rectal cancer. (Quality Improvement)	RECTCT	85%	100%	88.90%	93.90%	100%	91.30%	87.50%	85.71%

2017 AND 2016 SANFORD FARGO LIST OF CANCERS TREATED

Solid Tumors	2017			2016		
	Total	Male	Female	Total	Male	Female
Breast	322	3	319	325	0	325
Melanoma, skin	254	141	113	147	81	66
Prostate	234	234	0	203	203	0
Lung & Bronchus	229	116	113	222	115	107
Kidney & Renal Pelvis	92	62	30	108	75	33
Colon	92	39	53	103	52	51
Bladder	92	71	21	97	77	20
Benign CNS	78	25	53	85	32	53
Pancreas	75	37	38	76	42	34
Thyroid	72	23	49	96	22	74
Oral Cavity & Pharynx	68	49	19	86	65	21
Uterus	58	0	58	65	0	65
Rectum & Rectosigmoid	57	33	24	54	34	20
Other Endocrine	37	15	22	40	19	21
Liver & IBD	36	28	8	21	18	3
Malignant CNS	31	23	8	30	20	10
Ovary	31	0	31	20	0	20
Stomach	25	18	7	29	21	8
Esophagus	25	19	6	20	13	7
Testis	17	17	0	14	14	0
Gallbladder & Other Biliary	16	9	7	10	8	2
Larynx	15	12	3	12	11	1
Unknown Primary	13	7	6	11	3	8
Cervix	12	0	12	10	0	10
Soft Tissue	11	6	5	8	5	3

Solid Tumors	2017			2016		
	Total	Male	Female	Total	Male	Female
Ureter & Other Urinary Organs	11	10	1	6	6	0
Small Intestine	6	2	4	10	7	3
Anus	5	2	3	7	3	4
Vulva	5	0	5	5	0	5
Bones & Joints	3	2	1	5	4	1
Other Female Reproductive	3	0	3	3	0	3
Penis	3	3	0	2	2	0
Other Digestive System	2	1	1	5	3	2
Eye & Orbit	0	0	0	3	2	1
Other Sites	7	4	3	6	5	1

Hematopoietic & Lymphoid Neoplasms	2017			2016		
	Total	Male	Female	Total	Male	Female
Multiple Myeloma	29	18	11	41	22	19
Lymphoma						
Non-Hodgkin	94	52	42	78	43	35
Hodgkin	9	5	4	15	9	6
Leukemia						
Lymphocytic ALL	17	12	5	10	5	5
Lymphocytic CLL	25	18	7	31	20	11
Myeloid: AML	14	5	9	18	10	8
Myeloid: CML	11	10	1	12	7	5
Other leukemias	4	3	1	5	3	2
Other hematopoietic and lymphoid neoplasms	36	20	16	44	21	23

Total	2276	1154	1122	2198	1102	1096
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SANFORD MEDICAL CENTER COUNTY AT DIAGNOSIS

2017 Analysis

County at Diagnosis	Count (N)	Percent (%)	County at Diagnosis	Count (N)	Percent (%)	County at Diagnosis	Count (N)	Percent (%)	County at Diagnosis	Count (N)	Percent (%)
ND - Cass	679	29.83%	ND - La Moure	16	0.70%	ND - Nelson	4	0.18%	MN - Freeborn	1	0.04%
MN - Clay	263	11.56%	MN - Red Lake	15	0.66%	ND - Williams	4	0.18%	MN - Hennepin	1	0.04%
MN - Otter Tail	170	7.47%	MN - Clearwater	14	0.62%	ND - Pierce	3	0.13%	MN - Itasca	1	0.04%
MN - Becker	126	5.54%	ND - Griggs	14	0.62%	ND - Renville	3	0.13%	MN - Koochiching	1	0.04%
ND - Barnes	74	3.25%	ND - Foster	13	0.57%	SD - Grant	3	0.13%	MN - Lyon	1	0.04%
ND - Richland	72	3.16%	MN - Grant	12	0.53%	AZ - Maricopa	2	0.09%	MN - Ramsey	1	0.04%
ND - Stutsman	60	2.64%	MN - Kittson	11	0.48%	MN - Kandiyohi	2	0.09%	MN - St. Louis	1	0.04%
MN - Polk	54	2.37%	ND - Stark	11	0.48%	MN - Pope	2	0.09%	MN - Stearns	1	0.04%
MN - Beltrami	48	2.11%	ND - Pembina	10	0.44%	MN - Swift	2	0.09%	MN - Washington	1	0.04%
ND - County unknown	46	2.02%	ND - Ramsey	10	0.44%	MN - Todd	2	0.09%	MO - Outside state/ county code unknown	1	0.04%
ND - Traill	35	1.54%	MN - Cass	9	0.40%	ND - Mcintosh	2	0.09%	ND - Grant	1	0.04%
MN - Pennington	31	1.36%	MN - Roseau	9	0.40%	ND - Mclean	2	0.09%	ND - Logan	1	0.04%
ND - Grand Forks	29	1.27%	ND - Benson	8	0.35%	ND - Mercer	2	0.09%	ND - Mountrail	1	0.04%
ND - Ransom	29	1.27%	ND - Rolette	8	0.35%	ND - Sioux	2	0.09%	ND - Sheridan	1	0.04%
MN - Wilkin	28	1.23%	ND - Ward	8	0.35%	ND - Towner	2	0.09%	NV - Outside state/ county code unknown	1	0.04%
MN - Hubbard	27	1.19%	MN - Lake Of The Woods	7	0.31%	SD - Day	2	0.09%	PA - Outside state/county code unknown	1	0.04%
MN - Norman	26	1.14%	MN - Mahnomen	7	0.31%	AZ - Outside state/ county code unknown	1	0.04%	SD - Brown	1	0.04%
MN - Traverse	25	1.10%	MN - Wadena	7	0.31%	AZ - Pima	1	0.04%	SD - Campbell	1	0.04%
ND - Dickey	23	1.01%	ND - Steele	7	0.31%	AZ - Yavapai	1	0.04%	SD - Clark	1	0.04%
ND - Walsh	21	0.92%	ND - Wells	7	0.31%	FL - Duval	1	0.04%	SD - Corson	1	0.04%
ND - Burleigh	20	0.88%	ND - Eddy	6	0.26%	FL - Orange	1	0.04%	SD - Marshall	1	0.04%
ND - Sargent	20	0.88%	MN - Big Stone	5	0.22%	FL - St. Lucie	1	0.04%	WY - Campbell	1	0.04%
SD - Roberts	18	0.79%	ND - Cavalier	5	0.22%	IA - Pottawattamie	1	0.04%	XX - 423	1	0.04%
MN - Marshall	17	0.75%	ND - Mckenzie	5	0.22%	MN - Crow Wing	1	0.04%			
MN - County unknown	16	0.70%	ND - Kidder	4	0.18%	MN - Dakota	1	0.04%			
MN - Douglas	16	0.70%	ND - Morton	4	0.18%						
									Total	2,276	100.00%

THE CANCER THAT THREATENS OUR IDENTITY

THE HUMAN BRAIN

The human brain makes us unique as a species and even more unique as individuals. Brain tumors can adversely affect our personality, our behavior, our ability to reason and our memories in addition to physical functioning. Patients and their families understandably recoil at the word cancer, especially brain tumors. But as Dr. Anu Gaba, medical oncologist and Roger Maris



Cancer Center Service Chair points out, not all central nervous system (CNS) tumors are malignant or fatal. In 2017, more than 70 percent of the CNS tumors treated at the Roger Maris Cancer Center

were benign. Sanford and its staff welcome the challenge to offer care for all tumors - the benign and malignant whether affecting adults or children. Counteracting a devastating diagnosis takes a dedicated team aligned to a single goal: Curing when possible, but always caring with the focus on quality of life.

A SUBSET WITHIN SPECIALTIES

Different types of brain tumors appear in a developing brain versus an established one. As such, specialists at all levels of care focus on either pediatric or adult cancers. This distinction is incredibly important.

Brain cancer ranks only behind leukemia as the most common childhood cancer. Treating pediatric brain cancer considers not only survival, but also the treatments' long-lasting impacts on personality, behavior, motor function and memory. Since

younger children have a developing brain, standard treatments such as radiation and chemotherapy may have significant effects on the brain, leading to cognitive, developmental and behavioral problems. Injury to essential parts of the brain which are adjacent to the tumor and treatments may cause irreparable damage. In view of these challenges, it is important that novel approaches are adopted to improve outcomes in childhood brain tumors.

Cancers in developed adult brains typically manifest later in life accompanied by seizures, headaches or other symptoms. Addressing these types of cancer may include different treatment approaches. The goal is to treat the tumor while preserving as much existing function as possible. Aftercare, in particular, involves therapies to retrain the brain in order to compensate for what may have been lost or temporarily impaired.

STARTING WITH MULTIDISCIPLINARY TEAMS MAKING DATA-DRIVEN DECISIONS

As with all cancers, management of brain tumors is complex. Because of the vast number of functions performed by the brain, treatment requires absolute precision. Preserving the highest quality of life necessitates perspective from more than one point of view. Enter the Roger Maris Cancer Center's multidisciplinary approach to care. Depending on the type, location, and extent of tumor, different treatment modalities may be chosen. Providers at Sanford Fargo collaborate with one another daily regarding the best individual patient management.

A group of multidisciplinary practitioners also meet formally on a monthly basis to discuss individual cases. Each expert contributes the latest data in his or her field to a shared pool of knowledge, according to nationally





Increased understanding of the specific characteristics of each tumor has an impact on treatment options.

recognized guidelines. Together, they formulate a strategy based on the aggregated information. The team of clinicians may include neuro-ophthalmology, neurosurgery, neuro-radiology, neuro-psychiatry, medical oncology, radiation oncology, pathology and a neuro-oncology patient navigator.

ADVANCEMENTS IN GENOMICS HELP PREDICT OUTCOMES

Increased understanding of the specific characteristics of each tumor has an impact on treatment options. In the past, the tumors were categorized by histology (type of brain cell affected by the cancer) and grade (how abnormal the cell looks) as seen under the microscope. The science of genomics (study of the cell at the molecular level) has advanced the understanding of brain tumors. As further specialized testing of the tumor has been developed, certain individual mutations in the cancer cell DNA can be identified.

Knowing the molecular makeup and behavior patterns of these tumors through the genomic information gives the team opportunities to tailor the treatment to the molecular mutations found in those tumor cells. Some of the mutations can now be treated by specific targeted medications, rather than giving chemotherapy combinations which may have more side effects and may be now known to be ineffective in addressing tumors with those mutations.

APPLYING GENOMICS IN PEDIATRIC CANCERS

A recent explosion in the field of genomics offers a great potential for pediatric brain tumors. For example, the study of tumors at a molecular level has led to discovery that the most common type of pediatric cancer, medulloblastoma, comes in not one but four distinct classifications, with different prognoses and therefore warrants different treatment approaches.

Specific pathways contribute to the development of pediatric tumors. The identification of these pathways led to the production of drug treatments which target them. A number of diagnostic panels, including the OncoPanel have been developed to offer genomic testing. Onkids is also another genomic panel developed as part of a consortium with Sanford Health physicians as partners. RMCC offers some of these novel tests and treatment options to our patients and families.

And the future of clinical research looks even brighter. Sanford and the Roger Maris Cancer Center partner with worldwide entities, including The Children's Oncology Group (COG), to participate in clinical trials and accelerate the exchange and application of data.

2017 AND 2016 CENTRAL NERVOUS SYSTEM TUMOR DISTRIBUTION

CNS Tumors		2017 Total	Male	Female	2016 Total	Male	Female
Benign	Meningioma	58	15	43	55	16	39
	Schwannoma	12	7	5	20	13	7
	Other Benign Tumors	8	3	5	10	3	7
Malignant	Malignant Gliomas	16	12	4	10	5	5
	Glioblastoma Multiforme	11	9	2	16	11	5
	Other Malignant Tumors	4	2	2	4	4	0
Total		109	48	61	115	52	63





SPOTLIGHT PATIENT NURSE NAVIGATOR

Roger Maris Cancer Center treated patients who live a great distance from Fargo in 2017. The expense of travel, physical toll, and stress of time away from home for these patients and their families is a tremendous burden. The nurse navigator alleviates the stress by working to make the diagnosis and treatment schedules as efficient as possible. It's why they attend case meetings to ensure they have a complete and thorough view of the treatment plan.

But the nurse navigator offers something else: support. As the liaison between the patient and the rest of the healthcare team, the nurse navigator ensures that the patient's particular care needs are met. Whether answering questions about the treatment plan and providing educational materials or connecting patients with other resources, such as social workers who may assist with financial and other practical concerns, the nurse navigator is there to support patients and families at the time of diagnosis and initial treatment.

TREATMENT

Before any treatment begins, there must be an accurate diagnosis. Based on a patient's symptoms, the team runs tests, including scans to determine if cancer is present in the brain. If detected, it's crucial to identify the tumor's exact location and character.

A neurosurgeon extracts a biopsy and it's here that the applied field of genomics is useful. Insight into what type of cancer may be causing problems and how patients could react to treatment play a pivotal role in the plan of care determined by the multidisciplinary team.

In both adult and pediatric cancers, there are four grades of tumor, based on the threat the cancer poses, according to the character of the abnormal cells and how aggressive the tumor is to spread. Removal of the tumor via surgery generally resolves the issue for grade 1 tumor. As mentioned before, more than 70 percent of central nervous system cancers treated by the RMCC were benign.

For grades 2 and above, the multidisciplinary team devises a comprehensive treatment strategy, which may include a combination of surgery, chemotherapy and radiation.

SURGERY

Surgery appears at several phases in a treatment plan. It's necessary in obtaining a living cancer tissue sample. From there, surgery serves as the most common method to remove the vast majority of any tumor, if not the tumor in its entirety. Surgery also may relieve tumor-associated symptoms caused by the tumor compressing brain tissue.



The goal of any treatment is maximum removal without significant harm. Advances in technology help neurosurgical intervention attain this goal. Pediatric neurosurgeon, Dr. Tong Yang explains:

"Imaging guidance intraoperatively with intraop ultrasound is routinely used to target the tumor and avoid normal brain structures. Intraoperative monitoring, use of the knowledge of neuroanatomy to go through various surgical corridors to avoid direct traversing normal brain are used to help preserve normal brain function. Awake craniotomy in suitable teenagers, intraop brain mapping and preop fMRIs are also used to help preserve functional brain. Tumor cell labeling combined with specially modified microscope light filters, MRI tractography combined with subcortical retraction tubes are some of the newer technologies developed to help reduce the injury to the normal functional brain and maximize tumor removal."

Surgery is also an option for treatment of brain metastases from other types of cancer.



CHEMOTHERAPY AND ALTERNATING ELECTRIC FIELD THERAPY

Glioblastoma multiforme (GBM) is the most fatal brain cancer found in adults. It's the same cancer which claimed the life of Senator John McCain in August of 2018. Ninety percent of patients diagnosed with GBM will meet the same fate in less than two years.

Not only does it expand quickly, it does so through tendril-like structures. These tendrils make it nearly impossible to completely remove by surgery or radiation without posing a serious threat to a patient's quality of life. Without 100% extraction or elimination, GBM tends to return, greatly reducing life expectancy.



TTF treatments have shown to extend life from 15 to 20 months



Advances in medical oncology bring hope in the treatment of GBM. Because the care team understands the structure and behavior of GBM, they create a multi-prong strategy to combat it.

The treatment plan includes the use of Temozolomide, better known by its brand name Temodar®. Like all chemotherapy, certain drugs perform better than others. This is where genomics factors in. By understanding the molecular structure of a patient, the team can predict outcomes with greater accuracy than ever before. A MGMT promoter methylation found in patients indicates a better response to Temodar® treatments. Other mutations, such as the IDH1 mutation signal greater outcomes for the use of second-wave chemotherapy like PCV (procarbazine, lomustine (CCNU) and vincristine).

As with all treatments, potential side effects and complications factor heavily in the recommended course

of action. Young and healthy adults may receive Temodar® or PCV whereas older or at-risk patients may only use PCV to stave off the elusive GBM cells.

Molecular analysis of pediatric tumors, has led to the development of medications that target the genomic problems with less toxicity than standard chemotherapy. Some of these drugs include mTOR inhibitors, MEK inhibitors and BRAF therapy. A genomic case conference is held regularly to review treatment options for patients.

The FDA approved a medical device to help practitioners match the aggression of GBM. Tumor Treating Fields (Novocure's Optune® TTF) using alternating electric current to prevent cancer cell division and thus prevents the tumor from growing.

While the device can be cumbersome to wear, it does allow patients mobility to maintain a better quality of life in the face of a bleak prognosis.

Since its release in 2015, TTF treatments have shown to extend life from 15 to 20 months. However, more research is necessary to confirm the success solely stems from the TTF device and not another factor, such as Temodar® chemotherapy.

RADIATION

Dramatic changes in the field of radiation oncology allow the practice to center on the patient more than ever before. Identifying the molecular characteristics of brain cancers, such as gliomas, influences the radiation treatment approach. The radiation oncologist uses molecular information to help patients clarify treatment goals. Knowing the prognosis can potentially help with shared decision-making to decide whether a long course of radiation, a shorter course of radiation or hospice is most appropriate. It can also help in the decisions about whether and when to add chemotherapy. The treatment can be customized to the patient's exact situation.

For the many cancers which metastasize to the brain, advances in radiation therapy offer new options for treatment. Focused, high precision radiosurgery for brain metastases is valued if at all possible, compared to the prior historic standard of whole brain treatments. Recent data has shown that radiosurgery may offer similar control of the

brain metastases while minimizing the footprint of treatment on an individual's quality of life. Previously, radiosurgery was considered only for patients with one or a few brain metastases. Given advances in imaging with very thinly sliced MRI's, and advances in radiotherapy delivery, it is possible to deliver pinpoint radiosurgery to patients with as many as 10 or more metastases, as long as they are considered to have a low volume of total metastases. The radiosurgery techniques dramatically decrease the risk of memory dysfunction, fatigue and decreased quality of life compared to whole brain radiation treatments. Radiosurgery can be delivered in a single treatment compared to the 2 weeks of whole brain treatments. This allows more rapid sequencing of other types of treatments (chemotherapy, immunotherapy targeted medications). When surgical resection of brain metastases is the standard for high volume or severely symptomatic metastases, following surgery with pinpoint radiosurgery to the surgical site has shown similar cancer outcomes and much improved quality of life, compared with whole brain radiation treatments.

There is, however, a group of patients for whom whole brain radiation treatments are still the only effective method of cancer control in the brain. Advances in understanding of brain function and anatomy have helped to identify a region of the brain that has actively dividing cells and is critical in making and storing short term memory. Avoiding treating this subgranular zone of the hippocampus with radiation, which damages normal dividing cells, can help to minimize the negative cognitive effects of whole brain radiotherapy. Additionally, using a medication that is normally reserved for people with Alzheimer's disease during and after whole brain radiation has been shown to help preserve cognitive function by minimizing some of the damaging effect of radiation to the normal brain. So for those individuals with a long life expectancy from their cancer who require whole brain radiation, there

are tools to provide an effective safer treatment for their brain metastases while preserving their quality of life. As Dr. Miran Blanchard writes,

"It is a very exciting time to practice radiation oncology with a focus on brain tumors. Most of these changes have happened in the last few years. I eagerly await what the next decade holds!"

STATE-OF-THE-ART AT SANFORD

Advances in technology enable radiation oncologists to deliver more effective treatments with fewer side effects. The Roger Maris Cancer Center uses the Novalis Tx first developed by UCLA in 2009.

For an aggressive cancer like glioblastoma, radiation oncologists can deliver 6000 Centigray (cGy) in a single dose opposed to a couple hundred cGy daily for two weeks. Equally impressive is how radiation oncologists and technicians can target as small as 5mm or less than an eighth of an inch.

HERE'S HOW IT WORKS

A patient has a plastic mesh molded to their face and head, to keep the patient steady and in a reproducible treatment position. This mesh keeps the patient in place and avoids the need to adhere a frame by affixing it to a patient's skull.

With layered images taken from MRIs and other sources, the radiation oncologist maps the patient's brain via imaging software. He or she then selects the areas of the brain the radiation will target. Once the plan is in place, the radiation oncologist collaborates with one of three Sanford physicists to calculate the exact angles and trajectory of the hundreds of radioactive particle beams targeting the minute area of the brain affected by the tumor.

Once on the table, the Novalis Tx continually rotates to capture images of the patient's brain, adapting to even the most subtle movements. The machine will shut down if the beams are off by even 0.5mm or two hundredths of an inch.

Perhaps, most astonishing, is that the advances in radiation oncology for brain cancer are only a small part of the multidisciplinary approach. Similar technologically advanced tools and collaborative teams exist in medical oncology and neurosurgery. They all work in concert to deliver the best care.





SUPPORTIVE CARE

Roger Maris Cancer Center provides a team to support the patient and caregivers to negotiate, cope, and deal with stress related to the psychological, behavioral, and practical challenges that accompany a diagnosis and treatment of a brain tumor.

The brain naturally works to heal itself and reroute function following injury. Time plays a vital role in the brain's own retraining process. However, life goes on, and it's important for patients and families to obtain skills in order to cope with the present changes and future implications.

It is common for patients with brain tumors to experience anxiety, depression, and even suicidality. They might experience serious and frightening psychiatric conditions such as delirium, psychosis, mania, and dementia. Depending on the location of the brain tumor, cognitive effects such as memory problems, difficulties processing information, having a hard time paying attention or concentrating, and trouble understanding language or speaking. In addition, organizing thoughts, confusion, and trouble with judgment can also be a difficult adjustment. These symptoms can lead to an inability to do normal tasks. Personality changes including changes in temperament (mood swings) are hard for patients and families and can lead to difficulty in relationships.

Roger Maris Cancer Center has a team of PsychoOncology experts to assist patients and caregivers with the difficulties faced with a diagnosis and treatment for brain tumors. Patients are screened for distress to identify practical, physical, financial, and emotional issues. Social workers who have specialized training in working with cancer patients and caregivers complete a thorough bio-psycho-social assessment. The team assists in initiating and coordinating services for identified needs including respite care, palliative care, home health, nursing home, private hire services and hospice. Integrative services such as imagery, relaxation, Ayurveda, massage, Reiki, yoga, aromatherapy, hypnosis, biofeedback and mindfulness are available as a part of holistic cancer care offered to patients. Therapists specializing in cancer care are also available to provide interventions and supportive care to deal with the stress and psychological impact of the disease and treatments.

In adults, aftercare consists of equipping patients with compensatory strategies to adjust to and compensate for any adverse effects of brain cancer. For example, a provider will train a patient struggling with short-term memory how to set alerts or calendar reminders for routine activities such as taking medication. Another example is deploying strategies in the workplace to combat distractions if the patient struggles with concentration.

The pediatric oncology team, led by dedicated physicians and providers, offers physical and mental rehabilitation with the goal to aid these patients to recover as best as possible.

The pediatric oncology team, led by dedicated physicians and providers, offers physical and mental rehabilitation with the goal to aid these patients to recover as best as possible. There is a school reentry program where, with the permission of parents, providers reach out to the schools the children attend and discuss the appropriate expectations the schools should have. The team also talks to other children in the patient's class who may not know how to deal with the situation when the child returns to school.

Kamp KACE is a week-long summer camp for children who are currently battling cancer and children who have overcome it. The camp allows individuals to connect, heal and celebrate life through their shared experiences. This fun and supportive week offers a reprieve from the stress cancer causes. It's just one example of how our supportive care programs provide positive ways to help patients and their families.

CARE FOR THE CAREGIVERS

Imagine being a parent caring for a child with brain cancer or a child caring for their parent? The caregivers of patients with brain tumors are significantly impacted and need assistance in adapting and coping emotionally, physically, psychologically and practically. They are often overwhelmed and the quality of their life can decline due to prolonged stress from the prognosis, unpredictable course of the disease, changes in roles, and physical effects from stress.

It is common for caregivers to experience depression, anxiety, sleep loss, anger, frustration, and guilt. Caregivers often experience isolation, minimal time for self-care, and have the need to adjust and adapt in solving problems and making a decision. The neglect of their own needs can lead to caregiver burnout and they can become “hidden victims.” Therefore, addressing the caregiver needs is an essential component of providing comprehensive supportive care, like the kind given at Roger Maris Cancer Center and its programs like Thrive: a retreat for pediatric cancer caregivers.



SANFORD
ROGER MARIS
CANCER CENTER

OUR COMMITMENT TO CARE CONTINUES

Brains show remarkable adaptability and resolve in the wake of trauma such as a brain tumor. The team at Roger Maris Cancer Center emulates the traits of the brain: specialization, constant learning, collaboration, flexibility, and resilience. Individual research coupled with a multi-disciplinary approach informs group decisions on treatment plans. Applying the latest advances in technology, such as the Novalis Tx, reduce side-effects while improving the chances of success. Aftercare considers the wellbeing of not only the patient but all those impacted by a cancer diagnosis. The entirety of care is meticulously orchestrated to respect the time, comfort and quality of life for patients and their families. The reputation of the Roger Maris Cancer Center rests on its character and continued commitment to care. Thank you for reading the 2018 annual report and for your ongoing support of the Roger Maris Cancer Center.



Revive

A retreat for breast cancer survivors



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Ad Hoc for Pediatric Oncology issues

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Andrew Terrell, MD

Ad hoc Head and Neck Surgery

Terri Hedman, MSSL, BSN, RN, OCN

Clinical Educator, Sanford Health Office of Academic Affairs

Mari Nicholas

Recording Secretary

ACCREDITATIONS

Roger Maris Cancer Center holds a number of accreditations. Accreditation is a voluntary process in which outside reviewers closely examine our program and our results. If we meet or exceed specific standards, we receive the stamp of approval. For patient and families, accreditation is an important measure of quality.



Advance Care Certification by TJC for Palliative Care Services



Accreditation by the American College of Radiology, including Radiation Oncology Practice Accreditation



Accreditation by the National Accreditation Program for Breast Centers (NAPBC) through the American College of Surgeons



Edith Sanford Breast Health Comprehensive Center (Fargo) recognized as a Certified Quality Breast Center of Excellence through the National Consortium of Breast Centers (NQMBC)



Breast Imaging Center of Excellence (BICOE) through the American College of Radiology



Accreditation of Sanford Medical Center by The Joint Commission (TJC)



AMERICAN SOCIETY OF CLINICAL ONCOLOGY

Certification by the Quality Oncology Practice Initiative (QOPI) through the American Society of Clinical Oncology



AMERICAN COLLEGE OF SURGEONS
Inspiring Quality: Highest Standards, Better Outcomes

The accreditation of Sanford Medical Center by the American College of Surgeon's Commission on Cancer. In 2018, we celebrate 78 years of continuous accreditation, going back to 1940, reflecting a long history of quality care.