



Cancer Institute Annual Report 2018

From the President

Caring for our community is at the heart of our mission at St. Joseph's Medical Center. As the area's leading provider of comprehensive cancer care, St. Joseph's Cancer Institute has earned a reputation for having compassionate caregivers who truly care for each patient, and for providing university-level care, close to home. We pride ourselves in offering a wealth of resources to our patients, including dedicated Cancer Patient Navigators who support patients facing cancer from the time they are diagnosed, through treatment, follow-up and survivorship. Our Navigator Program was the first of its kind in the area and serves as an invaluable resource for patients. It is one of the key components of our comprehensive cancer program.



In addition to our Patient Navigators, our cancer care teams include nationally certified radiation therapists, physicists, oncology nurses, and board-certified physicians, all working together to design highly specialized treatment plans for our patients. We also offer advanced technology to deliver faster, easier, and more precise treatments, access to Clinical Research Trials and genetic counseling through our affiliation with the University of California, San Francisco, and an array of support services to help facilitate healing - mind, body, and soul. We recognize that the standards of our program directly affect the survival and quality of life for our cancer patients and so we continually strive toward goals that exceed national benchmarks.

I am extremely proud of our accomplishments and the high level of care we provide through St. Joseph's Cancer Institute and I'm delighted to present to you our 2018 Annual Report. This report provides a summary of our cancer program activities over the last year, and also includes tabulations of analytic cases that were accessioned into St. Joseph's Cancer Registry and reported to both the State Cancer Registry and National Cancer Database. With this data, health researchers are better able to look at risk factors for cancer, and treatment effectiveness, as well as determine where cancer related resources would best be directed, all helping us get to our ultimate goal of victory over cancer.

A handwritten signature in black ink that reads "Donald J. Wiley". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Donald J. Wiley
President and CEO, St. Joseph's Medical Center

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Cancer Institute Services

Advanced Cancer Treatment

At St. Joseph's we provide our cancer patients with comprehensive cancer treatment, including medical oncology, chemotherapy and infusion. We also offer advanced radiation therapy including:

- **Stereotactic Ablative Radiotherapy/Stereotactic Body Radiation Therapy** - This highly focused, intense dose of radiation is concentrated on a tumor, while limiting the dose to the surrounding organs and sparing healthy tissue. Most treatments are done in short outpatient visits of 30 minutes to 1 hour, requiring no hospitalization.
- **Stereotactic radiosurgery** - This noninvasive radiation therapy procedure involves a single session, single fraction high dose to a very small targeted volume of tissue.
- **Intensity-modulated radiation therapy** - This advanced mode of high-precision radiotherapy utilizes computer-controlled X-ray accelerators to deliver precise radiation doses to a tumor.
- **High-dose-rate Brachytherapy** - Brachytherapy places a radioactive source directly within the tumor to be treated, delivering a high dose of radiation to a precise area.

Inpatient Oncology

Located on the 3rd floor of the Pavilion, the inpatient Oncology Unit offers 20 private rooms in a calm, quiet setting. The unit is staffed with experienced oncology nurses who work closely with physicians and other specialty staff members to provide care for cancer patients.

Infusion Therapy

St. Joseph's Cancer Institute provides comprehensive intravenous therapies to meet a variety of patient needs, including providing a patient with fluid, blood or blood products, a drug or nutritional product into the bloodstream. Outpatient infusion therapy services are available Monday through Friday, 8 am to 4:30 pm. Our center is staffed with registered nurses with a wealth of clinical experience in oncology and infusion. To help keep our patients as comfortable as possible, patients are provided meals and most patient infusion chairs include a personal television. The clinical environment has custom murals of the delta wildlife. For a special treat on scheduled days patients are visited by our favorite service dogs.

Lung Cancer Screening Program

The Lung Cancer Screening Program at St. Joseph's offers those with a high risk of developing lung cancer the opportunity to be screened for lung cancer. Lung cancer usually does not present any symptoms until it is somewhat advanced, and only 15% of lung cancers are diagnosed in early stage. Early stage lung cancer is not only treatable, but often curable. Lung cancer screenings through St. Joseph's Lung Cancer Screening Program, the only one of its kind in San Joaquin County, are now covered by Medicare Part B and all major insurances. Learn more by calling **209.939.4526** or visiting **StJosephsCares.org/LungScreening**.

Tomosynthesis

St. Joseph's Women's Imaging Center offers digital breast tomosynthesis, also known as 3D mammography. With 3D mammography images of the whole breast are taken in slices (similar to a scanner), helping physicians to see all around and between the breast tissues. 3D mammography can be used for screening and diagnostics for the same clinical applications as traditional mammography for any type of breast, including women with dense breasts.

Genetic Counseling

St. Joseph's has expanded its affiliation with UCSF with the addition of genetic counseling services. Patients now have access to see a genetic counselor onsite at St. Joseph's by physician referral. Each month both new and returning patients are seen by a UCSF California licensed genetic counselor to assess the chance that they might carry a gene mutation in one of the hereditary cancer genes and/or assess their risk for cancer or additional cancers. If patients choose to pursue genetic testing this is facilitated at the clinic and the results are provided to the patient the next month. Follow up recommendations including increased screening or preventive measures are provided once testing is completed. All screening and testing guidelines follow the National Comprehensive Cancer Network hereditary cancer genetic testing and screening up to date guidelines.

Breast Center of Excellence

St. Joseph's Breast Center of Excellence offers comprehensive breast imaging services through our Women's Imaging Center and an array of services through our Cancer Institute, including a dedicated breast cancer patient navigator, access to genetic counseling and clinical trials through our UCSF affiliation, advanced oncology services and reconstructive breast surgery. St. Joseph's has received accreditation by the National Accreditation Program for Breast Centers (NAPBC) for our Breast Center of Excellence. Accreditation by the NAPBC is only given to those centers that have committed to providing the highest level of quality breast care and that undergo a rigorous evaluation process and review of their performance.



St. Joseph's Cancer Institute is Stockton's only cancer center accredited by the American College of Surgeons' Commission on Cancer. This accreditation recognizes our commitment to quality cancer services and patient care. In addition, our Cancer Institute has been recognized by the Oncology Nursing Certification Corporation for having staff nationally certified in oncology. We are also proud to have performance rates that consistently exceed statewide averages for treatment of breast cancer.

Cancer Institute Support Services

At St. Joseph's Cancer Institute, we truly believe in healing the whole person. In addition to offering advanced cancer treatment services, we offer a variety of programs and services designed to support patients and families experiencing a cancer diagnosis.

Cancer Patient Navigators

At the center of the various support services offered by St. Joseph's Cancer Institute, is our free Cancer Patient Navigator service. Our Cancer Patient Navigators help guide those facing a diagnosis of cancer to information, support and resources. Patients with cancer-related questions can call **209.939.4526** to speak with a Cancer Patient Navigator.

Cancer Institute Exercise Program

Cancer patients can participate in a 10-week cancer patient exercise program which meets twice a week at St. Joseph's. Each participant has an individual evaluation and customized exercise program designed for their specific needs. Classes are supervised by qualified cancer exercise trainers. This is a free program for St. Joseph's patients.

Nutrition Services

St. Joseph's provides registered dietitians to consult with patients regarding nutritional needs during treatment and to help develop a plan to meet their special needs.

Community Support Groups

St. Joseph's hosts several community-led cancer support groups which meet at St. Joseph's Medical Center. Currently, there are support groups for those with breast, or prostate cancer. In addition, groups for general cancer support and for Spanish speakers are available. For a full list of available support groups and meeting information, please call our Cancer Patient Navigator.

Reiki Relaxation Services

Reiki Relaxation Services are provided by our dedicated volunteers to cancer patients, survivors, and others facing serious illness. Services are offered free of charge and by appointment before or after surgery/treatment or at any time during your visit to St. Joseph's.

Special Events

We hold several special events each year for cancer patients including our Wellness in the Woods retreat for families dealing with cancer, the Gathering of Friends to gather socially for support, and our Treat-Meant For You spa day of pampering for cancer patients. To find out more about any of the Cancer Institute support programs and services listed in this section, please call our Cancer Patient Navigator at **209.939.4526**.

Treat-Meant For You 2018



Wellness in the Woods 2018



Gathering of Friends 2018



2017 Registry Activities

Under the supervision of the Cancer Committee, the Cancer Registry is the department of the Cancer Institute designed to collect, manage, analyze, and report information on every cancer patient diagnosed and/or treated at St. Joseph's Medical Center and St. Joseph's Outpatient Surgery Center. The data collected by the Cancer Registry is used to support the cancer program development, quality improvement initiatives, and outcomes analysis. Cancer registry data is used to measure compliance with evidence-based clinical practice guidelines endorsed by the American College of Surgeons Commission on Cancer through quality improvement studies. The data is reported to the Cancer Registry of Greater California where it is integrated into a population-based data system which is used to study trends in cancer incidence, diagnosis and treatment patterns, survival rates, and to investigate possible cancer clusters within the state.

In 2017, the Cancer Registry accessioned 1187 new cases bringing the total number of cases in the registry to 36,641. Aggregate data from the Cancer Registry is routinely analyzed by the Cancer Committee and is a valuable resource for oncology clinicians and program administrators. Our Cancer Registrars capture a complete summary of each cancer case from diagnosis through treatment and post-treatment follow-up which is maintained in an electronic database and can provide data for overall evaluation. The integrity of the data is closely monitored through dedicated quality control measures while strict confidentiality is maintained to protect patient privacy.

In addition to adding new cases annually, the Cancer Registry is responsible for conducting yearly follow-up on all living patients in the database. The Commission on Cancer sets a standard of 90% follow-up rate for eligible cases from the last 5 years and in 2017, the Cancer Registry consistently maintained rates above 90%. The Cancer Registry has also maintained an overall follow-up rate over 80% since its 2003 reference date, which is also a standard set by the Commission on Cancer. Compliance of these standards allow for accurate analysis of survival outcomes, disease recurrence rates, and monitoring the development of secondary malignancies.

Multidisciplinary Cancer Conferences

To facilitate a multidisciplinary approach to cancer diagnosis, staging, and treatment, St. Joseph's Medical Center holds a weekly educational cancer conference. These multidisciplinary conferences involve surgeons, medical oncologists, radiation oncologists, pathologists, radiologists, clinical research staff, nurses, and ancillary support staff. Cancer conferences maintain standards set by the Commission on Cancer and the American College of Surgeons. The goal of the conference is to offer patients the best and most current therapy by sharing information and ideas in a strictly confidential manner. Conferences bring cancer care specialists together to share ideas, discuss management, and review national treatment guidelines and research findings in order to create the best treatment or management plan for individual patients. Case presentations include a prospective discussion of pertinent radiology and pathology findings as well as a multidisciplinary discussion regarding the best course of action including potential participation in open clinical research trials.

Consultative Cancer Conference Topics for 2017

In 2017, 56 conferences were held with 186 cases presented. 99% of the cases were prospective presentations, discussing diagnosis, treatment, or follow-up care. One special presentation at cancer conference was held in 2017: Y90 Radioembolization for Liver Cancer.

Cancer Committee

The Cancer Committee is a multidisciplinary team comprised of representatives from physician specialties, nursing, administration, quality services, and the cancer registry. The group meets at least quarterly to ensure cancer program elements are in place and functioning as required by the American College of Surgeons Commission on Cancer. The goal of the Cancer Committee is to encourage plans for improvement and change, evaluate all cancer related activities and further strengthen services available to our cancer patients.

Cancer Registry Data

Most Common Primary Site by Sex Male

Prostate – 81
Lung – 66
Bladder – 52
Colon – 36
Rectal – 31

Female

Breast - 204
Lung - 72
Colon - 33
Pancreas - 31
Lymphoma - 24

Cancer Committee Members

Physician Members

Cancer Committee Chair – **Aminder Mehdi, MD**
Cancer Liaison Physician – **Ajithkumar Puthillath, MD**
Radiation Oncology Medical Director – **Gaurav Singh, MD**
Cancer Conference Coordinator – **Gaurav Singh, MD**
Diagnostic Imaging – **Pavan Khanna, MD**
Medical Oncology – **Neelesh Bangalore, MD**
Medical Oncology – **Prasad Dighe, MD**
Medical Oncology – **Chunhui Fang, MD**
Pathology – **Lily Pang, MD**
Radiation Oncology – **Edward Greenleaf, MD**
Surgery – **DeAndrea Sims, MD**
Surgery – **Jennifer McNeil, MD**
Palliative Care – **S. Richard Goldman, MD**

Non-Physician Members

Administration/Clinical Services – **Rae Charos, DNP, RN, FNP**
Cancer Program Administrator – **Charlene Smith, RT, RTT**
Clinical Research Coordinator – **Sherri Schmidt, RN, BSN**
Psychosocial Services Coordinator – **Noreen Tighe, MSW**
Quality Improvement Coordinator – **Charlene Smith, RT, RTT**
Cancer Registry – **Adina Bullock, BS, CTR**
Oncology Nurse – **Dorene Tomei, RN, MS, CNS, ANP, AOCN, CN-BN**
Palliative Care – **Laura Kahler, RN, BSN, CHPN**
Quality Management – **Ginger Manss, RN, MSN, AOCN, HACP, DNP**
American Cancer Society – **Samantha Ruegsegger**
Pharmacy – **Rose Hernandez, PharmD, Christie Stuhmer, PharmD**
Registered Dietician – **Teri Spring, RD**
Genetic Counselor – **Liane Abrams, MS, LCGC**
Rehabilitation – **Kim Paustenbach, MPT**
Support Services Coordinator – **Jim Linderman**
Community Outreach Coordinator – **Debbie Rinaldo**

ACoS Standards 4.4, 4.5

Accountability and Quality Improvement

Measures Cancer Program Practice Profile

Reports (CP3R)

The Cancer Committee at St. Joseph's Medical Center ensures and monitors that patients receive care according to nationally accepted measures. The Commission on Cancer (CoC) measures compliance with current CoC quality reporting tools – the Cancer Program Practice Profile Reports. Below is a summary of our most recent CP3R performance report which features patients treated in 2015 at St. Joseph's Medical Center.

Breast:

Radiation is administered within 1 year (365 days) of diagnosis for women under the age of 70 receiving breast conservation surgery for breast cancer – 90%

Tamoxifen or third generation aromatase inhibitor is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1c or stage IB-III hormone receptor positive breast cancer – 89%

Radiation therapy is recommended or administered following any mastectomy within 1 year (365 days) of diagnosis of breast cancer for women with 4 or more positive regional lymph nodes – 100%

Image or palpation-guided needle biopsy to the primary site is performed to establish diagnosis of breast cancer – 89%

Colon:

At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer – 96%

Lung:

CSystemic 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) Non-Small Cell Lung Cancer – 100%

Surgery is not the first course of treatment for cN2, M0 lung cases – 72% (Note – This measure was discussed in Cancer Committee; in the best interest of specific patients, surgical intervention may have been recommended as the first line of treatment.)

Rectum:

Preoperative chemotherapy and radiation therapy are administered for clinical AJCC T3 N0, T4 N0, or stage III; or postoperative chemotherapy and radiation therapy are administered within 180 days of diagnosis for clinical AJCC T1-2N0 with pathologic AJCC T3 N0, T4 N0, or stage III; or treatment is recommended for patients under the age of 80 receiving resection for rectal cancer – 100%

Introducing: Endobronchial Ultrasound

Josebelo D. Chong, MD

When a patient with a known or suspected lung cancer presents with mediastinal lymphadenopathy, establishing whether or not the lymph nodes are cancerous is crucial in determining their next step in care. Patients with no metastasis may be candidates for primary surgical resection. On the other hand, patients with biopsy-proven mediastinal involvement will likely need initial treatment with chemotherapy and perhaps radiation.

Available methods for sampling the mediastinum include conventional (sometimes referred to as “blind”) transbronchial needle aspiration biopsy (TBNA), mediastinoscopy, endoscopic ultrasound guided fine needle aspiration/biopsy (EUS-FNA/FNB) and endobronchial ultrasound guided transbronchial needle aspiration biopsy (EBUS-TBNA).

EBUS-TBNA, which is performed by a trained pulmonologist, is performed in a similar fashion as a standard bronchoscopy. Under either moderate sedation or general anesthesia, the instrument - which is essentially a specialized bronchoscope - is introduced into the airway, and the mediastinum is visualized with a tiny ultrasound probe built into its tip. The mediastinal structures are then carefully inspected. Enlarged lymph nodes or masses

are identified. Solid and vascular structures are differentiated visually, which is then confirmed with Doppler imaging. Once a satisfactory target for biopsy is found, it is punctured with a fine needle and samples are obtained. Sampling is done with real-time ultrasound imaging, maximizing the chances of procuring adequate specimens while minimizing the risk of inadvertently damaging surrounding structures. Special care is taken to identify and avoid hitting the blood vessels; there is usually little to no bleeding at the biopsy sites, even with multiple punctures. Overall, the procedure is very safe and can be performed on an outpatient basis, with no more risk of complications than those with a standard bronchoscopy with biopsy.

Over the past decade and a half, EBUS-TBNA techniques and equipment have advanced, and the procedure has gained wide acceptance as a low-risk, minimally invasive method of sampling mediastinal lymph nodes; in fact, current guidelines recommend utilizing EBUS-TBNA as the first option in the sampling of mediastinal lymphadenopathy suspicious for metastasis. Aside from cancer, EBUS-TBNA is also useful in providing information about mediastinal lymphadenopathy of unclear etiology, which may be related to infection or an inflammatory condition such as sarcoidosis.

Introducing: Endobronchial Ultrasound

continued

Previously, patients in our community required referral to an academic center to undergo EBUS-TBNA, which can be a complicated and time-consuming process. With the recent acquisition of convex probe EBUS equipment by Saint Joseph's Medical

Center, we are pleased to be able to offer this diagnostic procedure to the residents of San Joaquin County and surrounding areas. This will hopefully expedite the diagnosis of patients with suspected lung cancer and lead to their earlier treatment.

Reference:

Silvestri, et al. Methods for staging non-small cell lung cancer: Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest Journal 143:5:e211S-e250S.

Spotlight on Interventional Oncology

Pavan Khanna, M.D.



At St. Joseph's Medical Center, our team of fellowship trained Interventional Radiologists provide the most advanced minimally invasive image-guided treatments for cancer and cancer related disorders, also known as Interventional Oncology. Interventional Oncology has established itself as a key component in multidisciplinary oncologic care alongside

Medical, Surgical, and Radiation Oncology. These treatments are often used in conjunction with standard cancer treatments such as chemotherapy and surgery, to potentially achieve a cure, prolong survival, or help reduce cancer related pain. The minimally invasive and advanced nature of the therapies result in less pain, fewer side effects, and shorter recovery times compared to conventional therapy. In fact, almost all interventional procedures and treatments are performed on an outpatient basis.

St. Joseph's Medical Center is proud to offer many different options for locoregional therapy for both primary (hepatocellular carcinoma and cholangiocarcinoma) and metastatic liver cancer (colorectal, neuroendocrine, and breast cancer), including intra-arterial therapies and ablative techniques:

Intra-arterial treatments of hepatic neoplasms take advantage of the liver's dual blood supply, in which primary liver tumors and metastatic tumors derive up to 95% of

their blood supply from the hepatic arterial system, while the majority of blood supply (up to 75%) to normal liver is derived from the portal vein. Therefore, a significantly higher concentration of either radiation or chemotherapeutic drugs (up to 16 times higher) can be delivered to the tumor via the hepatic arterial system with less consequential systemic side effects than conventional chemotherapy or external radiation.

Transarterial Radioembolization

(TARE): Radioembolization, also known as selective internal radiation therapy (SIRT), is the newest intra-arterial liver cancer treatment where millions of tiny glass microspheres containing radioactive Yttrium-90 (Y90) are infused directly into the tumor vasculature through the hepatic artery, delivering very high doses of radiation directly and selectively to the tumor cells, while limiting exposure to normal liver tissue. This treatment can be used in early, intermediate, and advanced stages of the disease, with the possibility of curative intent in certain cases. It is also often successfully used as a neoadjuvant or downstaging treatment to surgical resection or liver transplantation, and in the palliative setting for both primary and metastatic disease to prolong survival. It can be used for solitary masses or multifocal disease. The goal of radioembolization is delivery of radioactive microspheres to the tumor bed via its arteriolar network, rather than occlusion of the macrovessels, allowing

for decreased side effects and options for future treatments. This treatment demonstrates the lowest side effect profile and has been shown to result in longer time to progression when compared to other forms of intra-arterial treatments.

Transarterial chemoembolization (TACE): Chemoembolization is another intraarterial treatment for liver tumors which involves the injection of chemotherapy agents and embolic materials directly into the artery supplying the tumor.

Percutaneous Ablative techniques (Microwave and Radiofrequency Ablation) deliver thermal energy and extreme high temperatures directly to the tumor resulting in cell death, a process called coagulative necrosis. It is considered an optimal locoregional treatment choice for early stage hepatocellular carcinoma or metastatic colorectal cancer to the liver. Several studies have reported similar outcomes when using percutaneous ablation versus surgical resection in small lesions (less than 3cm).

In addition to locoregional therapy for liver cancers, we are also able to treat focal cancers within the kidney, lung, and bone.

Kidney: Renal cell carcinoma (RCC) is the most common type of kidney cancer in adults. With the widespread use of cross sectional imaging techniques, more cases of RCC are being detected at an early stage. Percutaneous cryoablation is a well-established treatment option for patients with smaller RCCs (T1a), with

nearly 100% efficacy. It is considered a nephron sparing approach to treatment, and is often the choice for patients who prefer minimally invasive treatment options rather than surgery, have multiple comorbidities, or with decreased kidney function. It is routinely performed on an outpatient basis under moderate conscious sedation.

Bone cancer: Bone metastases can cause devastating clinical complications associated with dramatic reductions in quality of life, mobility, and independence, as well as excruciating refractory pain. Many patients with pathologic compression fractures in the spine present with intractable back pain. Kyphoplasty combined with radiofrequency ablation of spinal metastases not only offers significant pain relief, but also local tumor control and mechanical stabilization. Patients often describe a profound improvement in quality of life and pain following the intervention. Additionally, patients with extraspinal metastases can safely and effectively be treated with either cryoablation for pain control, or radiofrequency ablation with cementoplasty in weight bearing bones for pain control and mechanical stabilization.

Lung: Thermal ablation has emerged as an important and efficacious treatment option for nonsurgical lung cancer patients. This localized minimally invasive therapy is best suited for small nodular lesions or favorably located metastatic tumors.

Pancreatic Cancer

Gurtej Malhi, M.D.



Pancreatic cancer is the 4th leading cause of cancer related deaths in the United States, both in men and women. The risk of pancreatic cancer increases with age. Risk factors include hereditary causes (certain genetic syndromes where it can run in the family), hereditary pancreatitis, non-hereditary chronic pancreatitis, cigarette smoking, obesity, physical inactivity, and certain pancreatic cysts.

Patients most commonly present with jaundice, weight loss, anorexia, abdominal pain, new onset diabetes at advanced age, etc. Routine labs can be normal and are not very specific for a diagnosis of pancreatic cancer.

In patients with suspected pancreatic cancer, usually a diagnosis is made based on CT scan or MRI of the abdomen where a mass can be seen in the pancreas. This is usually followed by an endoscopic ultrasound with biopsy of the mass to confirm a diagnosis.

Endoscopic ultrasound has higher sensitivity and specificity for diagnosis of a pancreatic mass less than 2 cm as compared to CT. In patients with high suspicion (inconclusive CT findings), endoscopic ultrasound can be performed to diagnose a small mass. Patients with certain pancreatic cysts, chronic pancreatitis, and hereditary pancreatitis are considered for endoscopic ultrasound to screen for pancreatic cancer.

In 2017, around 56 patients were seen at St. Joseph's Medical Center with pancreatic cancer, out of which 39 patients were newly diagnosed.

At St. Joseph's, endoscopic ultrasound is offered for surveillance of pancreatic cysts and biopsy of pancreatic mass. We work with medical oncologists, hepatobiliary surgeons and radiation oncologists to provide multidisciplinary care to patients with pancreatic cancer.

The evolving role of radiation therapy in the treatment of pancreatic cancer

Kate Doerksen, MS, PA-C



Pancreatic cancer

Pancreatic cancer is the 12th most common type of cancer in the United States with 55,440 diagnoses projected in 2018. However, approximately 43,330 people diagnosed with pancreatic cancer are also projected to die of their disease in 2018, making it the 4th most common cause of cancer-related death in the US^{1,2}. Unfortunately, pancreatic cancer-specific mortality rates have

remained largely unchanged over the years despite many efforts to effectively treat the disease.

The treatment of pancreatic cancer, like many solid-tumors, is multidisciplinary in nature, with the overall stage of disease directing which treatment modalities are most appropriate. Surgical management with complete removal of the primary tumor remains the gold standard in localized pancreatic cancer with best chance at long-term survival. However, only approximately 20% of patients have localized and surgically resectable disease at diagnosis. Therefore, treatment for the majority of patients leans heavily on systemic therapies (chemotherapy), given the propensity for distant metastases. Local therapies, such as radiation therapy and surgery are utilized for local disease control when possible or necessary³. As technological advances are made, however, the role of radiation therapy in the treatment of pancreatic cancer may also be evolving.

Conventional radiation therapy

Radiation therapy, most commonly in the form of “external beam radiation therapy”, has an important role in the treatment of many types of cancer, in which focused beams of energy, typically photons or x-rays, are utilized to target and kill cancer cells by inducing damage at the DNA-level. As a local therapy, it only affects the specific area(s) being targeted by treatment; however, the effect of radiation will be exerted on both cancerous cells AND normal cells within the treatment field. Thus, radiation therapy techniques must balance the desired cancer-cell kill with damage done to nearby normal cells.

Conventional radiation therapy achieves this balance by “fractionating” the total dose of radiation needed for cancer cell death. In other terms, the total desired dose of radiation is split into several small doses, or “fractions” of the total dose, and delivered daily over several weeks. This allows for repetitive insults on the cancer cell DNA, eventually leading to cancer cell death. Normal cells are also bombarded by the radiation during this time, but with intact internal repair mechanisms, in addition to a two-day break built into each week of treatment, this damage is only sub-lethal, and once the radiation treatment course is complete, most normal cells will go on to completely recover. While care is taken to minimize radiation dose to normal cells during treatment, inevitably, a certain amount of normal cell damage is accepted in order to maximize cancer cell death. It is this “collateral” damage which results in acute

The evolving role of radiation therapy in the treatment of pancreatic cancer

continued

radiation-specific toxicity, or side effects, and remains the limiting factor in treatment.

Stereotactic radiotherapy

In recent years, significant technological advancements in radiation delivery systems as well as CT and MRI-imaging, have led to the development of specialized radiation therapy techniques, such as stereotactic body radiotherapy (SBRT), also referred to as stereotactic ablative body radiotherapy (SABR). These techniques allow for extreme precision and strict conformity of the radiation beam on the cancerous target, significantly decreasing the radiation dose to surrounding normal cells. This in turn, results in decreased treatment-related toxicity, and importantly, also allows for delivery of a significantly higher, *ablative* dose of radiation to the cancer cells. The benefits of achieving ablative doses of radiation without increasing side effects are multifold, and importantly, translates to improved tolerability and a shorter treatment course overall for patients (3-5 fractions vs. ~30 fractions), while also increasing the efficacy of radiation with the higher biological effective dose achieved compared to that of conventional radiation therapy.

Radiation therapy in pancreatic cancer

Conventional radiation therapy has been utilized in a variety of clinical scenarios for the treatment of pancreatic cancer. It is commonly received concurrently with radiosensitizing chemotherapy, either: 1) before planned surgery with goal of increasing likelihood of margin-negative resection (neoadjuvant setting); 2) following surgery in patients meeting specific criteria, such as positive resection margins or node positive disease (adjuvant setting); 3) for unresectable but

non-metastatic disease with goal of durable local disease control (definitive setting); 4) palliation of tumor-related symptoms (metastatic or nonmetastatic disease); or 5) for locally recurrent disease³.

The role of SABR in pancreatic cancer is not fully defined given a lack of prospective level I data. However, building on the success of SABR in the treatment of early stage lung cancer and the treatment of distant metastases in a variety of cancer types, this technique is now also being applied in pancreatic cancer. Small retrospective and early phase prospective studies have demonstrated good tolerability and local control rates of SABR in pancreatic cancer, comparable to that achieved with this technique in other cancer types⁴.

Evidenced-based practice

At this year's American Society of Clinical Oncology (ASCO) annual meeting, two new potentially practice changing studies were presented, one of which looked specifically at the use of conventional radiation therapy with concurrent chemotherapy in the neoadjuvant setting for pancreatic cancer. The PREOPANC-1 study randomized nearly 250 patients with potentially resectable pancreatic cancer to receive neoadjuvant chemoradiation therapy or immediate surgery. Preliminary analysis demonstrated an overall survival of 17.1 months in the neoadjuvant treatment arm compared to 13.7 months in the immediate surgery arm ($p=0.047$), suggesting a favorable trend in survival with neoadjuvant chemoradiation therapy. Importantly, there was no statistical difference in serious adverse events reported between the treatment arms⁵. The authors did acknowledge that perhaps

The evolving role of radiation therapy in the treatment of pancreatic cancer

continued

more contemporary chemotherapy regimens, such as FOLFIRINOX, in addition to the use of advanced radiation techniques, such as SABR, could potentially lead to even more positive outcomes.

Earlier studies have looked at the use of SABR in the neoadjuvant setting for borderline resectable pancreatic cancer. In 2015, Jin He et al published their experience comparing surgical outcomes of patients with borderline-resectable pancreatic cancer receiving neoadjuvant SABR vs. chemoradiation therapy (CRT) vs. chemotherapy only. When compared to neoadjuvant CRT and chemotherapy only, the neoadjuvant SABR group had a higher rate of margin-negative (R0) resections (90% vs. 84% vs. 62%, $p=0.02$). Furthermore, the SABR group achieved a higher complete pathologic response (21%) compared to the CRT and chemo alone groups (4% and 0%, $p<0.001$)⁶. Long-term data is needed to assess the impact

this may have on overall survival; however, given that R0 resection has previously been associated with improved prognosis compared to those with R1/R2 (microscopic/grossly positive margin) resections, one might expect to see a positive correlation.

Further research is warranted looking at the utility of SABR in the treatment of pancreatic cancer. However, early data suggests good tolerability and potential positive outcomes in certain settings. Until more data is available, clinicians and patients should continue to work together on an individual basis to decide which multidisciplinary treatment plan works best for their particular clinical scenario. The Dignity Health St. Joseph's Cancer Institute maintains a multidisciplinary approach to treating all cancers, including pancreatic cancer, and remains committed to providing access to state of the art treatment modalities, such as SABR and SBRT.

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Pancreatic Mass: A Surgeon's Perspective

Ilia Gur, MD, General, Liver and Pancreas Surgeon



According to St. Joseph's Cancer Institute's latest data, our hospital has seen an almost twofold increase in the number of pancreatic cancer patients within the past two years, rising from 24 to 57. Obviously, this data is very concerning. Therefore, when I was asked to write an article about pancreatic cancer by our Cancer Institute's coordinator, I initially was looking into writing a typical piece so frequent in medical

bulletins. It would usually contain some dry statistical data, typical symptoms (that are usually very subtle and frequently appears late in the disease, making an early detection difficult at best), range of treatment options and survival (usually lumped by stages) and very generalized.

Then I considered all the patients I saw in my years of practice-frightened by their diagnosis, unsure about the future, shaky, tearful, and surrounded by worried family members. The last thing that they want in those moments is another physician who provides them the dry statistics and detached view of the therapies and prognosis. They have already read that information on the internet and all it did was add to the confusion and worries. No, in those moments they want a healer, someone who speaks their language and most of all, provides them with a glimpse of hope. In this article I will try to present a different perspective on this disease and hopefully dispel some of the undeserved nihilism about the treatment and outcomes.

First, let me start by saying that frequently ANY pancreatic lesion is automatically considered to be a pancreatic adenocarcinoma (a type of a cancer with more serious prognosis). This assumption is not entirely correct. There are many other types of pancreatic lesions that have a far better outlook than above, yet the general population and even some primary care providers place them under the same category as a "dreaded" adenocarcinoma. I'm referring to tumors of the ampulla of Vater, Mucinous Cystic Neoplasm, Neuroendocrine tumor, IPMN and simple pancreatic cysts. The aforementioned lesions can be often be completely removed with surgery, portend far better prognosis and frequently require no additional treatment (many patients probably think chemotherapy here) besides close surveillance. In my experience, the upfront negativism about prognosis of patient with pancreatic masses of less aggressive nature is often unwarranted.

Therefore, it is very important when diagnosed with pancreatic tumor is not to dwell on negative thoughts but to become a health conscious patient and advocate for a prompt and appropriate initial work-up. The first steps in the work-up are crucial and would frequently determine the rest of the treatment strategy. One of the most important imaging tools of investigation is a high resolution, thin cuts, IV contrast (what we usually call "Pancreatic protocol") CT scan. Properly ordered and performed scans will provide important anatomical insights of tumor location, spread, involvement of blood vessels,

Pancreatic Mass: A Surgeon's Perspective

continued

as well as some clue of the type of tumor and surgical resectability (ability to be completely removed). Here at St. Joseph's Imaging Center we are fully equipped with technology to perform these imaging studies.

Next, a prompt referral to a specialist specializing in pancreatic surgery is crucial in "orchestrating" the correct imaging studies, blood tests and referrals to additional specialists on a team. Dr. Ilia Gur is a fellowship-trained pancreatic and liver surgeon practicing in Stockton who has performed multiple operations on pancreases allowing the patients to receive special-level care locally, at St. Joseph's Medical Center. Dr. Gur is part of a multidisciplinary team of doctors in the Cancer Institute, specializing in care for this complex group of patients and is working in close collaboration with medical oncologists, radiation oncologists, pathologists, radiologists and other specialists.

An additional important step is to obtain the tissue diagnosis of the pancreatic lesion. Here, the crucial role belongs to an expert interventional endoscopist. Here our patients benefit from the presence of a fellowship-trained GI specialist Dr. Gurtej Malhi, who brought this unique expertise to St. Joseph's Cancer Institute. In fact, some of the aforementioned increase in the number of pancreatic tumor patients that we see is attributable to his increased ability to detect early tumors with endoscopic Ultrasound and US guided biopsy.

Following the biopsy, and having all necessary images done, the discussion is brought forth during one of the Tumor Board meetings.

The importance of this step cannot be overemphasized. This is an essential step in any successful cancer program and this is where the patients benefit from a combined, mutually enriching environment where multiple specialists can develop a patient-oriented diagnostic and treatment plan.

When a surgery is recommended there are a few aspects that a pancreatic surgeon deems important: whether the tumor can be removed (resectability) and whether the patient may appropriately recover from it. While we, as surgeons, make constant progress in what can be safely removed and pushing our envelope further, a successful surgery largely depends on what we call "patient factors".

Here I emphasize the importance of good general health prior to surgery. Healthy eating habits, regular exercise, avoiding obesity and smoking place the patient in a good place to be able to tolerate even the most challenging of surgeries. I frequently compare being in good health to being prepared for a storm - a person with good amount of supplies of food, water, batteries has an easier time dealing with a natural calamity than an unprepared one. Although pancreatic surgery is considered to be one of the most challenging fields in general surgery, a well-prepared patient with a positive outlook will have a faster recovery and less perioperative complications.

Cancer Clinical Research Trials

St. Joseph's Clinical Research Department conducts many oncology trials. Some trials are conducted by local investigators and sponsored by St. Joseph's Medical Center, others are sponsored through pharmaceutical companies and many are through our affiliation with UCSF Helen Diller Family Comprehensive Cancer Center and the National Cancer Institute.

Breast Cancer Trials

ABC

Purpose: To compare the effect of aspirin (300mg daily) versus placebo upon invasive disease free survival in early stage node-positive HER2- breast cancer patients.

BR003

Purpose: To determine whether the addition of carboplatin to an adjuvant chemotherapy regimen of doxorubicin/cyclophosphamide followed by paclitaxel will improve the invasive disease-free survival in triple negative breast cancer

NSABP B55

Purpose: Assess the effect of adjuvant treatment with olaparib on invasive disease free survival versus placebo in BRCA+, HER2- patients

Polaris

Purpose: To study palbociclib prescribing and treatment patterns in advanced breast cancer and to explore patient perceived tolerability, biomarkers underlying resistant or response mechanisms to palbociclib treatment, as well as geriatric assessment in elderly patients.

Soothe

Purpose: To determine if non-contact low-frequency ultrasound will decrease pain, improve quality of life and reduce days of grade 2 or above radiation induced dermatitis compare to standard of care.

Other Cancer Trials

Alchemist (non-small cell lung cancer [NSCLC])

Purpose: To test resected NSCLC for genetic mutations and facilitate randomization into mutation specific adjuvant studies.

MDS/AML (Blood Cancer)

Purpose: observational study to use the information collected to help better understand

quality of life, patterns for diagnosis, treatment & outcomes, including disease progression and survival in newly diagnosed patients.

RTOG 0924 (Prostate Cancer)

Purpose: To compare and determine overall survival in patients with “unfavorable” intermediate risk or “favorable” high risk prostate cancer who receive androgen deprivation therapy with either whole-pelvic radiation therapy or high dose prostate and seminal vesicle radiation therapy.

BRCA-1 and BRCA-2 Testing

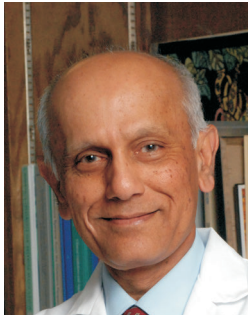
The BRCA (Breast Cancer susceptibility gene) test uses DNA analysis to identify harmful changes (mutations) in either one of the two breast cancer susceptibility genes — BRCA1 and BRCA2.

Women who have inherited mutations in these genes are at an increased risk of developing breast cancer and ovarian cancer compared with the general population.

The BRCA gene test is offered only to people who are likely to have an inherited mutation based on personal or family history, or who have a specific type of breast cancer. The BRCA gene test isn't routinely performed on women at average risk of breast and ovarian cancers.

A BRCA gene test determines whether a person carries an inherited BRCA mutation. If they do, their result is positive and their doctor can help them understand their cancer risk. If the patient does not have a mutation, this is considered a negative result. However, patients may learn they have a gene variant that doctors aren't sure about. It may or may not be associated with an increased risk of breast and ovarian cancer. This result is known as a variant of uncertain significance.

Meet Our Team of Physicians



Medical Oncology

Prasad R. Dighe, M.D.

Dr. Dighe completed a fellowship in hematology/oncology at St. Francis Hospital, Evanston, Illinois, and his residency in internal medicine also at St. Francis Hospital. He completed his undergraduate studies and received his medical doctorate from the M.S. University of Baroda, India. Dr. Dighe is board certified in internal medicine. He joined the medical staff at St. Joseph's Medical Center in 1981.



Medical Director, Radiation Oncology

Gaurav Singh, M.D.

Dr. Singh is a board certified radiation oncologist who recently joined St. Joseph's Regional Cancer Center. Dr. Singh specializes in advanced radiation therapy treatments. Prior to coming to Stockton, Dr. Singh completed a residency in internal medicine at University of California San Francisco and acted as chief resident of radiation oncology at Kaiser Permanente Los Angeles Medical Center. Dr. Singh also served as a clinical instructor at Stanford University School of Medicine before bringing his expertise to Stockton.



Chairman, Cancer Committee

Aminder S. Mehdi, M.D.

Dr. Mehdi completed his medical education at Dayanand Medical College in Punjab, India. He completed an internship at Dayanand Hospital, Punjab, India, and residencies in internal medicine at All India Institute of Medical Sciences, New Delhi, India, and Oldham Area Health Authority, Oldham, United Kingdom. After moving to North America, Dr. Mehdi completed an internship at Regina General Hospital, Saskatchewan, Canada, a residency in internal medicine at St. Paul's Hospital, Canada, and a residency in medical oncology with the Cancer Control Agency, Vancouver, Canada. Dr. Mehdi is board certified in internal medicine and in medical oncology. He joined the medical staff at St. Joseph's Medical Center in 1987.



Radiation Oncologist

Edward C. Greenleaf, M.D.

Dr. Greenleaf received his M.D. from University of Alabama in Birmingham, Alabama. He completed a residency in radiation oncology at the University of California, Los Angeles, and a residency in internal medicine at the University of Florida-Gainesville. Dr. Greenleaf completed fellowships in rheumatology at University of Alabama Hospital in Birmingham, Alabama, and at Wadsworth VA Hospital, Los Angeles, California. Dr. Greenleaf is board certified in internal medicine, radiation oncology, and therapeutic radiology. He has been a member of the medical staff at St. Joseph's Medical Center since 1987.



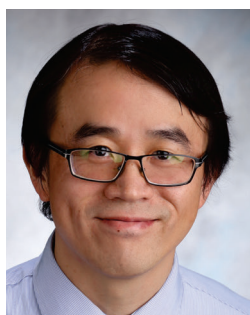
Hematologist/Oncologist
Neelesh Bangalore, M.D., PhD

Dr. Bangalore completed fellowships in Hematology/Oncology from Georgetown University in Washington, D.C. He completed his internship and residency at Providence Hospital in Washington, D.C. which is affiliated with George Washington University in Washington, D.C. Dr. Bangalore completed his undergraduate degree in Bombay (Mumbai), India and received his MD at Seth G.S. Medical College and King Edward Memorial Hospital, Mumbai, India. Dr. Bangalore has board certifications in Medical Oncology and Internal Medicine. He joined St. Joseph's medical staff in 2001.



Hematologist/Oncologist
Ajithkumar (AJ) Puthillath, M.D.

Dr. Puthillath completed his medical training from Mysore University, India. He then completed his internship and residency training in Internal Medicine at McLaren Regional Medical Center, Michigan. During his residency, he was awarded the PGY-2 outstanding resident of the year and the "Ambassador Award" for the best outgoing resident. Dr. Puthillath completed his fellowship in Hematology and Oncology at Roswell Park Cancer Institute (RPCI), New York. RPCI is the oldest cancer center in the US and is part of the NCCN designated cancer centers. Dr. Puthillath has numerous research publications in peer reviewed oncology journals and has actively presented in the American Society of Clinical Oncology meetings.



Hematologist/Oncologist
Chunhui Fang, M.D.

Dr. Fang received his medical degree from Beijing Medical University, China. He also obtained a Master of Pharmacology degree from the Peking University Health Science Center and a Master of Genetics from Albert Einstein College of Medicine (AECOM) in Bronx NY. Dr. Fang completed his internship/residency training in Internal Medicine at AECOM/Jacobi Medical Center in 2011. He is board-certified by American Board of Internal Medicine. He spent the next 3 years working as a hospitalist, where he specialized in the management of complicated hospitalized patients. He went on to complete his fellowship training in Hematology/Oncology at Stony Brook University Medical Center and received extensive training in the management of patients with blood disorders or cancer. He has written multiple articles in Hematology and Oncology which were published in peer-reviewed journals.

Meet Our Team of Physicians



Hematologist/Oncologist
Sunny Philip, M.D.

Dr. Sunny Philip completed his fellowship in Hematology and Oncology at Stony Brook University School of Medicine in Stony Brook, New York, where he also served as chief administrative fellow. Dr. Philip has extensive training in the treatment of a variety of malignancies and blood disorders. Dr. Philip completed his Internal Medicine residency at Stony Brook University School of Medicine, where he has been board certified by the American Board of Internal Medicine since 2014. He graduated magna cum laude with honors, with a Bachelor's of Science in Biology from the University of Texas Pan American. He received his medical degree from St. George's University School of Medicine. Dr. Philip is board certified in Hematology and Oncology. He is committed in bringing quality and emphatic care to the people of San Joaquin County.

Meet Our Team



The staff at St. Joseph's Cancer Institute represent a multidisciplinary team that includes board certified radiation oncologists, on-site certified physicists and dosimetrists, radiation therapists, cancer nurse specialists, and social workers. We are committed to giving all of our patients personalized, quality care with the highest level of service excellence.

Contact Information

Cancer Registry and Tumor Board	467.6466
Cancer Navigator Program	939.4526
Inpatient Oncology Department	467.6480
Palliative Care Services	461.5489

St. Joseph's Cancer Institute 467.6560

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Registered Dietician 327.0110

Teri Spring, R.D.



**St. Joseph's Foundation
of San Joaquin**

A Dignity Health Member

As a not-for-profit organization, St. Joseph's relies on philanthropic support to provide many of the educational and support programs offered through the Cancer Institute. To make a donation, please call St. Joseph's Foundation at **209.467.6347**.

About St. Joseph's Medical Center



St. Joseph's Medical Center is a not-for-profit, fully accredited, regional hospital with 355 beds, a physician staff of over 800, and more than 2,300 employees. St. Joseph's specializes in cardiovascular care, comprehensive cancer services, and women and children's services including neonatal intensive care (NICU). St. Joseph's Medical Center is the largest hospital, as well as one of the largest private employers in San Joaquin County. In addition to being nationally recognized as a quality leader, St. Joseph's is consistently chosen as the "most preferred hospital" by local consumers. Founded in 1899 by Fr. William B. O'Connor and administered by the Dominican Sisters of San Rafael, St. Joseph's continues to lead the region in medical innovation as well as ongoing clinical research, developing tomorrow's advancements, today. St. Joseph's Medical Center is a member of Dignity Health, a system of hospitals and medical centers in California, Arizona and Nevada. For more information, please visit our website at StJosephsCares.org.



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