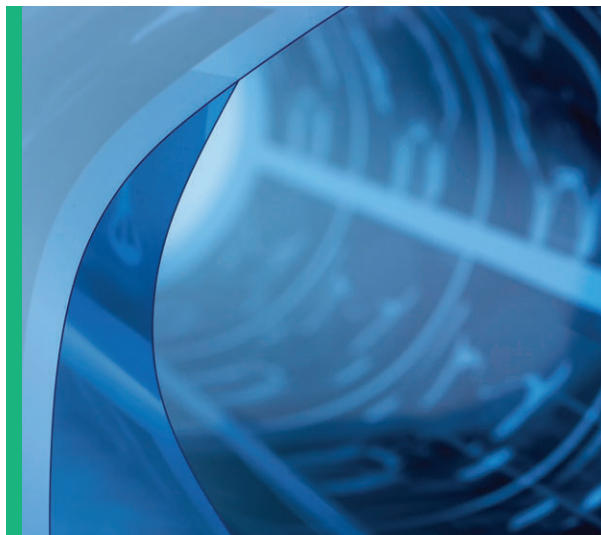




2019
Cancer
Annual
Report



Transformation



For more information about cancer programs at Rush or to refer a patient for an initial visit or a second opinion, **please call (312) CANCER-1.**

The Rush University Cancer Center comprises all of the cancer-related clinical, research and educational efforts at Rush, crossing 20 departments, divisions and sections; inpatient and outpatient areas; professional clinical activities; and the colleges of Rush University.

Rush is an academic health system comprising Rush University Medical Center, Rush Copley Medical Center and Rush Oak Park Hospital.

PLEASE NOTE: All physicians featured in this publication are on the medical faculty of Rush University Medical Center. Some of the physicians featured are in private practice and, as independent practitioners, are not agents or employees of Rush University Medical Center.

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State of the Rush University Cancer Center

Transformation is at the heart of everything we do at the Rush University Cancer Center.



Mia Levy, MD, PhD

The Sheba Foundation Director
Rush University Cancer Center

Cancer cells don't shelter in place. As cancer specialists, we know this. And our patients know this. So when COVID-19 hit, we kept this top of mind as we mobilized and adjusted our operations to continue caring for our patients, despite state mandates that required us to delay elective procedures and cut down on in-person appointments.

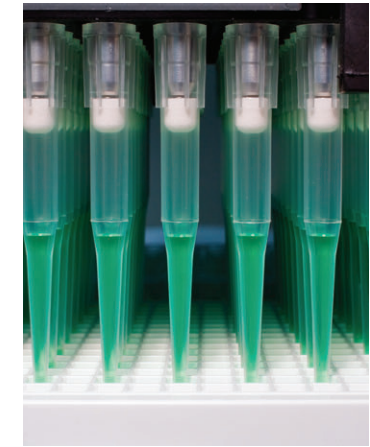
But we never closed our doors. **We never stopped delivering care.** In just four weeks, we made changes that would have normally taken years to fully implement. We shifted as many in-person appointments as possible to telemedicine and reconfigured our operations to minimize patient and staff risk. We learned how to treat patients with COVID-19 and effectively cared for our cancer patients who had COVID-19.

While challenging, these efforts worked well. Our patients continued to get the care they needed, when they needed it. Telemedicine appointments allowed us to both follow-up with our established patients, but also see new patients who could not afford to wait for a diagnosis or treatment. Our staff — from our frontline nurses and techs to our physicians, advanced practice providers and leaders — stepped up.

While I am incredibly proud of the way our entire Cancer Center team came together to successfully transform the way we deliver the highest quality cancer care, I am not surprised by it. Transformation is at the heart of everything we do at the Rush University Cancer Center. When I took on the role as the director of the Cancer Center at the beginning of 2019, our vision was to transform our already exceptional cancer services into a nationally recognized destination for the most advanced, comprehensive cancer care.

We spent 2019 building a solid foundation to bring this vision to life. This report highlights many of the transformative efforts we have implemented to elevate the care we provide — making Rush a leader in innovation and advanced treatments. Some notable highlights include the following:

- **Value stream transformation:** With a focus on patient experience and time to first cancer treatment, our program for continuous process improvement created a team of 600 problem solvers in the Cancer Center. The culture of rapid experimentation and iterative refinement gave us the foundation to successfully implement the rapid changes needed during the pandemic.
- **Precision oncology program:** We launched our precision oncology program, which uses genomic testing to help find treatments for patients who have advanced cancers that have not responded to standard treatments.
Learn more on page 8.



- **CAR T-cell therapy:** We delivered our first CAR T-cell therapy treatment in 2019. Bringing CAR-T to Rush was a system-wide, multidisciplinary effort that involved our clinical specialists in medical oncology, bone marrow and stem cell transplant, critical care and others as well as our non-clinical colleagues in patient finance, insurance and others.
Learn more on page 10.
- **A learning system for breast cancer screening:** Our breast cancer team has implemented a breast cancer risk assessment program as a collaborative effort between breast imaging, breast surgery, medical oncology and cancer genetics.
Learn more on page 18.
- **New building:** In 2019, we broke ground on the Joan and Paul Rubschlagger Building, which will be the home of our cancer and neuroscience service lines. We've designed and built this building around the feedback and guidance from our staff and patients to ensure that our new Cancer Center hub helps continue to grow and support our vision when its doors open.
Learn more on page 6.

Above: COVID-19 safety measures in place in the Cancer Center (top) and the Rubschlagger Building groundbreaking in June 2019 (bottom)

All of these transformative efforts — and more — prepared us to respond swiftly, effectively and compassionately during this extraordinary time of COVID-19. Our culture allowed us to embrace and implement comprehensive change.

Looking forward, it's clear that this challenging time has actually helped Rush University Cancer Center grow stronger as we continue looking ahead. I couldn't be more proud of the work we've done. I'd like to take this opportunity to thank our partners and staff who are at the heart of everything we have done and will continue to do for our patients.

— Mia Levy, MD, PhD

Rush University Cancer Center

At a Glance

The Rush University Cancer Center comprises all cancer-related clinical, research and educational efforts at Rush, crossing 20 departments, divisions and sections; inpatient and outpatient areas; professional and clinical activities; and the colleges of Rush University.

Recognition and accreditations

- Rush is accredited by the Commission on Cancer (CoC), a quality program of the American College of Surgeons (ACS).
- The Coleman Foundation Blood and Bone Marrow Transplantation Clinic is accredited by the Foundation for the Accreditation of Cellular Therapy (FACT).
- Rush's pathology and clinical laboratories are accredited by the Joint Commission.
- Four times in a row, Rush has received Magnet status — the highest recognition for nursing excellence — from the American Nurses Credentialing Center.
- For the fifth consecutive year, Rush University Medical Center's lobectomy program received the highest possible rating — three stars — from the Society of Thoracic Surgeons (STS).
- The Rush Radiosurgery program is one of the few Novalis-certified radiosurgery centers in the country.
- Cancer services at Rush are consistently ranked among the best in the country by *U.S. News & World Report*.
- The Regenstein Breast Imaging Center at Rush is an American College of Radiology-accredited Center of Excellence. This designation is awarded to centers that have received full accreditation in mammography, breast ultrasound, and stereotactic and ultrasound-guided needle biopsies.
- The Association for the Accreditation of Human Research Protection Programs has awarded Rush full accreditation with distinction in community programs, giving special recognition to Rush's community-based participatory research.
- In 2019, Rush received Vizient's Quality Leadership Award, ranking No. 1 among 99 academic medical centers. It is the seventh consecutive time Rush has been ranked among the top five in the study and the tenth time since the University HealthSystem Consortium, now part of Vizient, began the study in 2005. Rush is the only medical center in Illinois to have received this award. The 2019 study evaluated participating medical centers and hospitals on the basis of safety, timeliness, effectiveness, efficiency, equity and patient centeredness.
- Rush University Medical Center is a designated National Pancreas Foundation Center of Excellence. This designation recognizes Rush's multidisciplinary treatment of pancreatic cancer, treating the whole patient with a focus on the best possible outcomes and an improved quality of life. Rush is the only health system in Illinois to earn this designation.
- The Rush University Cancer Center has been recognized by the Quality Oncology Practice Initiative (QOPI®), an affiliate of the American Society of Clinical Oncology. The QOPI® Certification Program certifies oncology practices that meet nationally recognized standards for cancer care. This certification reaffirms our commitment to providing patients with high-quality cancer care.

Research that advances medicine

The Rush University Cancer Center fosters research across four broad programs that aim to advance the prevention, detection and treatment of cancer:

- Cancer biology
- Clinical, behavioral and translational research
- Molecular signatures and cancer outcomes
- Tumor immunology

Comprehensive clinics

Rush, which serves adults and children with cancer, is home to The Coleman Foundation Comprehensive Clinics. These multidisciplinary clinics apply a team approach to patient care. The clinical team gathers to discuss each patient's condition, review diagnostic tests and develop a treatment plan, often in collaboration with the patient's diagnosing physician. The comprehensive clinics are dedicated to the following*:

- Blood cancers and bone marrow transplants
- Brain cancer
- Breast cancer
- Chest and lung tumors
- Gastrointestinal cancers
- Head and neck cancers
- Inherited susceptibility to cancer
- Leukemias
- Lymphomas
- Multiple myelomas
- Myelodysplastic/myeloproliferative neoplasms
- Prostate cancer
- Sarcoma
- Spine tumors

Residency and fellowship programs

- Residency in radiation oncology
- Residency in nuclear medicine
- Fellowship in hematology/medical oncology
- Fellowship in orthopedic oncology
- Fellowship in hospice and palliative medicine
- Residency in general surgery

Supportive care

Rush University Cancer Center is committed to helping patients and their families cope with the psychological, emotional and spiritual challenges often associated with a cancer diagnosis. Available support services at Rush include the following:

- **Urgent care walk-in clinics** specifically for cancer patients at Rush to help limit emergency room visits and hospitalizations for common symptoms such as edema, nausea, vomiting, pain and difficulty breathing.
- **Social work services**, including licensed clinical social workers dedicated to cancer patients at Rush, as well as a social worker from the American Cancer Society.
- **Psychotherapy and other psychosocial oncology services** to help patients, caregivers and families manage stress and physical symptoms.
- **Nutrition counseling** with a registered dietitian to help improve overall health and manage side effects.
- **Palliative care**, with expanded services that focus on reducing pain, stress and other symptoms.
- **Pastoral services** from chaplains at Rush to support the spiritual and emotional health of patients and families.
- **Survivorship care** planning that includes a comprehensive plan for patients and their primary care physicians regarding the cancer care received and follow-up recommendations.
- **Integrative therapies** — such as acupuncture and massage therapy — through the supportive oncology program.
- **Genetic counselors** dedicated to the Cancer Center to counsel patients with suspected predispositions to breast, gynecologic and gastrointestinal cancers, along with rare endocrine tumors and sarcomas.

Learn more about our supportive oncology program on page 22.

*The cancer center also has tumor conferences for a number of other disease sites. See pages 26 to 29 for a complete list of disease site conferences.

Building a State-of-the-Art Hub for Cancer Care

Rush patients and staff have helped inform the design of the Joan and Paul Rubschlager Building, which will house comprehensive care and leading-edge clinical research.



In June of 2019, Rush University Medical Center broke ground on the Joan and Paul Rubschlager Building, a modern, 480,000-square-foot outpatient center made possible by the largest philanthropic gift in Rush's history.

While the COVID-19 pandemic has slowed the timeline for the building to be completed, the \$450 million building will be a destination center for cancer care, as well as neurosciences, when it opens its doors in a few years. It will house outpatient services for comprehensive cancer care under one roof. Patients will have access to new treatment options at the Cancer Center through expanded clinical trials; supported by an expanded clinical research sample processing and storage space. Additionally, technology-equipped spaces for conferences, tumor board meetings and instruction will foster even more collaboration among faculty, students and staff.

"In planning the Rubschlager Building, our goal is to make the patient experience as positive and as seamless as possible," says **Omar Lateef, DO, CEO** of Rush University Medical Center. "From the moment patients enter the front doors, we want them to experience personalized attention that makes their transitions through the building comfortable and smooth."

Left: Joan and Paul Rubschlager

Planning with, by and for Rush's patients

"In order to make the new building a world-class center for cancer and neurosciences, Rush is working closely with the patients and families who will use the center, and also gathering input from staff who will work in the building," says **Patricia Nedved, MSN, CENP**, associate vice president, ambulatory transformation at Rush.

Rush's cancer patient advisory council weighed in on design elements, the use of technology within the building, clinical care spaces such as the infusion center and more. And their input has helped shape all aspects of the building. For example, patients said they wanted individual rooms in the infusion center for privacy and space during their treatments, and the new infusion space will house all private infusion rooms.

The transformation team at Rush visited several other facilities to plan the building. "Our goal during these visits was to look at best practices to validate that we are in alignment and to learn from other centers," explains **Anthony Perry, MD**, vice president of ambulatory transformation at Rush. "We looked at how services are designed, the ease of check-in and check-out, flow of patients and employees throughout the building, how the infusion services are built, and the ease of travel through the building for patients and visitors."

A look inside

Located on the northeast corner of Ashland Avenue and Harrison Street on Chicago's Near West Side, the Rubschlager Building will have an enclosed walkway connecting it to Rush's Tower hospital building across Ashland.

Outpatient clinical services and amenities housed there will include the following:

- The latest technology and equipment for diagnostic imaging
- On-site radiation oncology with linear accelerators and radiosurgery
- On-site lab draw and processing
- A retail and specialty pharmacy
- Retail spaces and food options, including a Cancer Center boutique
- 60 individual cancer infusion rooms
- 73 cancer exam/treatment rooms
- Acupuncture and massage rooms
- Infusion and investigational drug pharmacies
- Respite and lactation rooms for staff
- Outdoor space for patients, visitors and staff
- An adjacent, six-story, 900-space parking facility





Above: Ashiq Masood, MD, and Mia Levy, MD, PhD

“A Watershed Moment” in Cancer Care

Rush’s multidisciplinary precision oncology program — one of only a few in the country — launched in 2019 to integrate patients’ genomic data with their health and treatment history for personalized care plans.

Cancer care is evolving quickly, driven by cancer genomics: the study of how gene expression in tumor cells differs from that of normal cells, and the therapeutic implications of those differences.

“This is a watershed moment in cancer, where we are understanding and treating cancer as we never have before,” says **Ashiq Masood, MD**, co-director of the precision oncology program at Rush. “With precision oncology, we are understanding cancer at a molecular level and personalizing care by targeting specific markers based on a tumor’s genetic make-up.”

The program is led by experts with training in cancer genomics as well as doctoral training in biomedical informatics, including co-director **Mia Levy, MD, PhD**, the Sheba Foundation Director of the Rush University Cancer Center, who helped create the nation’s first web-based precision cancer medicine reference guide to bring clinical decision support to physicians.

Now, when a Rush physician believes a patient would benefit from genomic testing, the physician can order a test with one click and send a tumor and/or blood sample to Tempus, Rush’s genomic testing partner. Tempus’ broad-panel genomic tests identify a patient’s actionable genomic variants and yield therapeutic options — including matched clinical trials — for the patient’s molecular and clinical profile.

The report flows directly into Epic, turning raw data from gene tests, genetic panels and complete sequencing into actionable genomic indicators that enable clinicians to make

Rush’s program, available to patients who live anywhere in the world, supplements the care provided by patients’ primary oncologists in a collaboration that typically works as follows:

- The primary oncologist refers an adult patient who has an advanced-stage solid tumor diagnosis.
- The patient meets with the team in Rush’s precision oncology consult clinic for an exam, blood draw and biopsy, if needed.
- The team conducts comprehensive tumor testing and analysis to identify genomic changes and their treatment implications. If the patient has already completed genomic testing before the visit, the team interprets and analyzes the results.
- The precision oncology tumor board — which meets weekly and includes medical oncologists, pathologists, radiation oncologists, surgical oncologists, computational biologists, pharmacists and others — does a deep dive into the genomic profile.
- The team develops a personalized set of treatment recommendations, potentially including off-label therapies or clinical trials, and shares the plan with the oncologist and patient.
- The patient and oncologist discuss the recommendations. If they elect to move forward, the Rush team can help with prior authorizations and other steps needed to get off-label drugs, and can also help with enrollment in clinical trials at Rush or other institutions.

Every step of the way, Rush aims to be a partner in care. “We work with clinicians to offer clarification on complicated genomic results,” says Levy. “We also provide patient counseling and assistance on off-label drug use, including medical necessity request paperwork. We’re here to help customize and tailor treatment to each patient.” ■

customized, data-driven treatment decisions in real time. No matter what their background in genomics, providers can now integrate genomics information into the clinical decision-making process. “The tiny changes in our DNA that allow some cells to become cancer cells also provide clues to how we can treat and prevent cancer,” says Levy. “Historically, genomic sequencing results were scanned into the EHR (electronic health record) as a PDF, but you can’t do much with that. Connecting genomic data with the rest of a patient’s story provides a more complete picture.”



Organoids predict tumor responses to treatment options

Rush researchers are exploring new ways to personalize cancer therapy by testing therapies on 3D organoids, which are lab-grown reproductions of a patient’s actual tumor cells.

Lung cancer researchers at Rush are currently investigating individual tumors’ responses to standard of care, targeted, off-label and combination therapies. And a proposed project will investigate whether patient-derived tumor organoids can predict patient responses to neoadjuvant treatment for breast cancer.

“If that technology works out, we may start to see the clinical validity of organoids in a prospective way, which could be a new strategy for precision oncology,” Levy says. /

“Cancer care has reached a pivotal moment when the amazing promise of genomic medicine is actually part of the daily practice of medicine,” said **Ranga Krishnan, MB, ChB**, CEO of Rush University System for Health. “We’ve long known that cancer cells contain the clues physicians need to identify treatments precisely designed according to a patient’s DNA, but few providers had the expertise to decode that information. Integrating genomic test results into the electronic medical record — where point of care decisions are made — makes the power of cancer genomics part of routine cancer care at Rush.” /

Bone Marrow Transplant Team



Opposite: The BMT team (left to right), Jacqueline Baptista, APN, Sunita Nathan, MD, Celalettin Ustun, MD, M.J. Hussain, MD, and Ankur Varma, MD, MPH

More Therapies for More Patients

The Coleman Foundation Blood and Marrow Transplant Program at Rush grew significantly in 2019, with three new physicians joining the team and more than 80 patients receiving transplants. Patients with hematologic cancers and other blood diseases benefit from new therapies, a dedicated post-transplant clinic and seamless collaboration among Rush specialists.

BMT procedures available at Rush include autologous and allogeneic stem cell transplantations, as well as cord blood transplantation — an important option for patients who need allogeneic transplants but don't have matched donors. The National Marrow Donor Program says that while 77% of white patients are likely to find a matched adult donor on the registry, that number drops to 46% for Latinx patients and just 23% for Black patients. "Using cord blood means that no patient will go without a donor," says **Sunita Nathan, MD**, associate director of the BMT program. ■

program brings together the kind of truly multidisciplinary team that sets Rush apart. "Our team came together immediately and ran like clockwork," reports Nathan.

The team includes neuroscientists, specialists from the medical intensive care unit and neuro-intensive care unit, infectious disease specialists, the clinical trials office team, advanced practice providers, pharmacists, nurses and others collaborating closely on patients' treatment.

"We have all of these systems and disciplines working together to bring this to our patients," says **Celalettin Ustun, MD**, The Coleman Foundation Chair for Bone Marrow Transplant. "And although others may offer CAR T-cell therapy, they may not be able to see patients as quickly as we can. These are aggressive diseases, and patients do not have time to wait for treatment. We want to be sure that all patients can receive treatment right away." /

Fast-track clinic reduces length of hospital stays, boosts patient comfort

Since 2018, Rush's fast-track BMT clinic has provided post transplant care 365 days a year for patients experiencing any issues or side effects; now, its services also include chemotherapy and CAR T-cell therapy infusions. The outpatient clinic is actually housed within the inpatient BMT unit, and has significantly reduced the length of hospital stays for BMT patients while still ensuring that they're able to be seen each day.

"Patients appreciate being able to go home, where they're comfortable," Nathan says. "And when they come in, their time here is streamlined. There's no waiting for bloodwork or infusion requirements, for example. We know exactly what they need and get it done in a short time frame in a safe environment on the BMT unit, which is set up for immunocompromised patients. If they have any kind of issue, they're able to come in any day, including weekends and holidays."

Plans for the coming year include offering pre-transplant conditioning in the clinic, and adding a physical therapy center where BMT patients can receive assessments and therapy sessions while being seen in the clinic.

Throughout their treatment at Rush, BMT patients' quality of life is paramount. "We are not only focused on the physical treatment of patients — we also focus on the mental, emotional and social part," Ustun says. ■

Provider spotlight:



A growing team pursues innovative treatments

In 2019, Rush welcomed three new BMT specialists to its program, all of whom had recently completed prestigious fellowships at leading transplant programs around the United States.

"There are only a handful of BMT fellows across the country each year," Ustun says; "they have many options for jobs, but chose Rush because of its dedication to developing new therapies for treating cancers."

Hematologist **M. J. Hussain, MD**, joined Rush after completing a fellowship at Stanford Hospital and Clinics. **Ankur Varma, MD, MPH**, a hematologist and medical oncologist, came to Rush from the University of Texas MD Anderson Cancer Center. And hematologist and medical oncologist **Hyun Don Yun, MD**, joined Rush from the University of Minnesota Medical Center.

All three are involved in clinical and translational research, including research on transplantation immunology, that aims to improve transplant outcomes.

The BMT team also includes six advanced practice providers — **Jacqueline A. Baptista, NP**; **Kristy L. Luke, NP**; **Debra A. Marinovic, PA-C**; **Ashley Reimer, PA-C**; **Kathryn M. Tinari, PA-C** and **Mallory B. Weber, PA-C** — who focus solely on BMT patients, providing expert personal attention and ensuring continuity of care. /

In fiscal year 2019, the Rush BMT team:

Treated four CAR-T patients — the first in Rush history

Increased its number of transplants by: **45%**



Above: Vineet Gupta, PhD

Excellence in Pancreatic Cancer Care

Pancreatic cancer is among the deadliest cancers in the United States. Pancreatic ductal adenocarcinoma, which accounts for more than 90% of pancreatic cancer cases, is the only type of cancer with an overall five-year survival rate in the single digits. It is expected to surpass colorectal cancer this year as the second leading cause of cancer deaths in the United States.

Rush is facing these sobering statistics by bringing together a multidisciplinary team of specialists — including medical oncologists, surgical oncologists, general surgeons, radiation oncologists and gastroenterologists — who work together to tailor the most effective plan of care for each patient.

“Every case of pancreatic cancer is unique, and each patient needs a therapy precisely designed for them.”

— Sam Pappas, MD, chief of surgical oncology

Center of excellence

The National Pancreas Foundation (NPF), has recognized Rush University Medical Center as a National Center of Excellence for Pancreatic Cancer. This designation is given to hospitals that have demonstrated the multidisciplinary approach, social support and advanced research resources needed to successfully treat this devastating disease.

“Being named a national center of excellence assures our patients that we have both the people and processes to help them through every step of surviving pancreatic cancer,” says **Ashiq Masood, MD**, director of the gastrointestinal cancer program. The Medical Center is one of only 43 hospitals in the country — and the only one in Illinois — to earn this distinction.

The NPF’s centers of excellence program was created five years ago, when the NPF saw a growing need from patients who frequently reached out for pancreas disease specialist recommendations. NPF Centers go through an extensive auditing process and are high-quality, multidisciplinary facilities that treat the whole patient.

“This NPF designation is a testament to Rush investing in the tools, technologies and people that are saving lives at Rush today and leading innovation that will be replicated nationally,” says Singh.

NPF Centers of Excellence go through a months-long auditing process to demonstrate they have met a series of criteria developed by a national task force of pancreatic cancer experts.

Those criteria are focused on the following three areas: ➤

“While surgery is typically the best option for long-term survival, Rush surgeons work closely with medical oncologists and radiation oncologists to determine very specific sequences and doses of chemotherapy, radiation and immunotherapies that we believe will work best for them.”

Together, the team is able to provide patients who have pancreatic cancer with the most advanced diagnostic tools and treatments including the following:

- Staging studies, including axial imaging and diagnostic modalities including endoscopic ultrasound (EUS) and endoscopic retrograde cholangiopancreatography (ERCP) to diagnose pancreatic cancer and provide stage-appropriate therapies
- Tumor molecular profiling
- Complex surgical intervention, including robotic surgeries
- Chemotherapy, radiation therapy and immunotherapies
- Innovative clinical trials and leading-edge research ➤

“The gastroenterology and endoscopy providers are usually the first people to tell the patients and their families about their cancer diagnosis,” says **Ajaypal Singh, MD**, director of advanced endoscopy. “Knowing that we have a very strong and dedicated multidisciplinary team to take care of these patients going forward makes our job easier while discussing the life-altering diagnosis with patients and their families.” ■

- **Designated core personnel:** The hospital must demonstrate how a multidisciplinary team of pancreatic cancer specialists coordinates efforts for each patient. Those specialists include a program director, medical oncologists with primary practice in gastrointestinal cancers (including expertise in pancreatic/hepatobiliary malignancies), a pathologist with expertise in gastrointestinal malignancies, radiation and interventional oncologists, gastroenterologists and surgeons who perform a minimum of 20 pancreas resections a year for three consecutive years.
- **Clinical trial access:** Hospitals must be leaders in developing new drugs and treatments, with patients having access to approved clinical trials testing novel therapies for pancreatic cancer.
- **“Whole patient” support:** Beyond advanced clinical expertise, the hospital must be able to demonstrate a comprehensive commitment to social, educational, nutritional and emotional support programs designed to treat the “whole person.” These programs may include patient and family support groups, social worker access, pain management service and mental health support.

Rush researchers reprogramming pancreatic cancer

Pancreatic cancer has a high mortality and doesn’t respond to most of the immunotherapies that have revolutionized the treatment of other cancers. But a Rush research partnership has discovered a potential way of reprogramming cells to make immunotherapy effective for treating pancreatic cancer.

Vineet Gupta, PhD, The Charles Arthur Weaver Chair of Cancer Research and vice chair for innovation in the Department of Internal Medicine at Rush University Medical Center, and **David DeNardo, PhD**, associate professor of medicine and of pathology and immunology at Washington University School of Medicine, are co-senior authors of “Agonism of CD11b reprograms innate immunity to sensitize pancreatic cancer to immunotherapies,” published in the July 2019 edition of *Science Translational Medicine*.

The study focused on macrophages, a type of myeloid cell present in pancreatic ductal adenocarcinoma that has been postulated as a major mechanism of resistance to immunotherapy. A receptor protein in these myeloid cells, CD11b, plays a central role in recruiting the cells to tumors and signaling whether the immune system should respond. Cancer cells are especially adept at disrupting the processes by which myeloid cells are able to control tumor growth — and in pancreatic cancer, the number of myeloid cells that help tumors grow far outnumber those that suppress them. Gupta and DeNardo’s findings suggest that tumor-associated macrophages (TAMs) that have been deceived by pancreatic cancer cells into not attacking them can be reprogrammed with a specially designed molecule, ADH-503. The novel ADH-503 compound binds with and activates CD11b receptor proteins on the myeloid cell surface, interfering with the cells’ migration and polarization.

When the researchers orally administered the ADH-503 compound to mice with pancreatic cancer, the number of myeloid cells in and near the tumors dropped — and the remaining myeloid cells were shown to be ones that promoted, rather than suppressed, immune responses. This environment resulted in greater numbers of cancer-killing T-cells within the tumor, significantly slower tumor growth and longer survival. The researchers then investigated whether creating this same environment could make pancreatic tumors susceptible to standard immunotherapy. First, they treated a control group of mice with a checkpoint inhibitor (PD-1 inhibitor) immunotherapy used to treat other kinds of cancer. There was no measurable effect. But when the therapy was combined with the ADH-503 compound, the tumors shrank and the mice survived significantly longer. Phase 1 clinical trials began in the fall of 2019 to assess the safety of the combined ADH-503 compound and checkpoint inhibitor immunotherapy; if the treatment is found to be safe, additional studies will assess its effectiveness. ■



Above: Alan Blank, MD, MS, and Junyoung Ahn, MD
Opposite: Marta Batus, MD

Driven by Expertise and Innovation

Rush leads the way in using new technology to treat sarcoma patients — and is the only cancer center in the nation studying an innovative plasma device that can remove cancer without damaging healthy tissue.

3D printing enhances limb preservation for sarcoma patients

Advances in sarcoma therapies mean that patients can expect excellent oncologic and functional outcomes — and with patients living longer, healthier lives, preserving as much limb function as possible is more important than ever. The Rush orthopedic oncology team, including **Steven Gitelis, MD**, director of the sarcoma program, and orthopedic oncologists **Alan Blank, MD, MS**, and **Matthew Colman, MD**, is studying the efficacy of 3D technology in limb preservation. Sarcoma surgery is performed in two complex steps: The first removes the cancer with adequate margins, and the second reconstructs the bone (and the joint, if necessary).

During the first step, data from the patient's CT and MRI can be used to print a 3D anatomic model for the surgical team. The model depicts the extent of the cancer in the bone and soft tissues and shows the relationship of the malignancy to nerves and blood vessels. "Before the surgery I can feel the tumor, and feel where the important arteries and nerves are," says Blank. "So when I go into

the surgery, I can actually put my hands around the tumor, and I know where I am, because I've been there before." A cutting guide can be printed to aid the surgeon in removing just the right amount of bone and tissue to ensure removal of the cancer while sparing normal bone and joint tissue. The cutting guide can also be used to create precisely fitted bone allografts — an effective technique for challenging sites like the pelvis, a very large, complex bone that supports the spine and hip joint and lies in close proximity to vital structures such as the bladder, bowel, blood vessels, nerves and arteries. Surgeons have historically performed pelvic bone cuts freehand, with a significant amount of estimation. But 3D-printed cutting guides allow the engineers and surgeon to more precisely plan the resection to ensure complete removal of the cancer.

The same technology can be used to manufacture modular endoprotheses to replace resected joints and bone tissue. Conventional devices, which are cast or machined, have limited ability to aid bone and soft tissue ingrowth — but 3D-printed devices in cobalt chrome or titanium can be engineered with variable porosity sizes to promote healing of bone and soft tissue such as tendons and ligaments. Patients with these devices benefit from improved gait, strength and implant stability. /

Low-temperature plasma technology

Rush's orthopedic oncology team is advancing the treatment of musculoskeletal cancers by leading an international clinical trial that is studying a ground-breaking surgical tool and technique using a low-temperature plasma scalpel for sarcoma surgery. Rush is one of two international sites participating in this trial; the other is at Sheba Medical Center in Tel HaShomer, Israel.

"Hybrid cold plasma is a tool that can be used for coagulating but also cutting — and it operates at body temperature, which doesn't kill healthy tissue," says Gitelis. "It can also be used to treat the cavity around the cancer after surgery to eradicate any microscopic disease."

Rush University Medical Center is one of the few hospitals in the U.S. that has the plasma scalpel, and Rush orthopedic oncology surgeons are the only surgeons in the country using the device to remove sarcomas.

"Low-temperature plasma technology is one of the most innovative and exciting tools in cancer surgery today. It has allowed us to operate on patients whose cancers would have been inoperable in the past."

— Steven Gitelis, MD, director of the sarcoma program

The low-temperature plasma scalpel, operates at close to body temperature, allowing surgeons to operate directly next to nerves and arteries without the risk of damaging these healthy surrounding structures. The tool's ability to cut and coagulate simultaneously helps significantly reduce blood loss, which is crucial during major, open sarcoma surgeries.

Under the next phase of testing, Gitelis looks forward to the helium plasma device tool's potential to prevent cancer recurrence. Used in conjunction with adjuvant chemotherapy and radiation therapy, the plasma device can be used to remove microscopic residual disease — which causes cancer recurrence at the resected site — after surgery.

In addition to using the scalpel for surgically removing soft tissue sarcomas, bone cancer and metastatic bone cancer, Gitelis is optimistic that all cancer surgeons will be able to use this innovative tool for breast cancer and other cancer surgeries at Rush.

"We're just at the beginning of this new treatment," says Gitelis. "Over the next few years, I hope we can refine it further to make it more effective for more cancers." /



Adolescent and young adult sarcoma program

At Rush, successfully treating adolescents and young adults who have sarcoma starts with care tailored to the distinct needs of this age group.

Caring for these patients, who range in age from 15 to 39 years old, can be difficult because they don't fall fully under pediatric or adult cancer care. Rather, they cross over both specialties. Often that means these patients are shuffled between specialists.

At Rush, however, the adolescent and young adult sarcoma program — led by medical oncologist **Marta Batus, MD** — brings together a multidisciplinary team of pediatric and adult medical oncologists, along with radiation oncologists and supportive oncology specialists. It is the only program of its kind in Chicago.

The team works together and coordinates all aspects of patients' care, resulting in individualized care plans that address the physical, emotional and social needs and challenges facing these patients.

The program focuses on curing the cancer without sacrificing quality of life for these young patients. The program offers the following:

- Limb-sparing surgery that removes the tumor without amputation.
- Expandable prostheses to help correct limb length discrepancies.
- Fertility preservation to allow these young patients to have children when they get older.
- Clinical trials in partnership with the National Cancer Institute and the Children's Oncology Group. ■



Longer Life, Plus Quality of Life

New diagnostic technologies and leading-edge therapeutic options offer patients highly effective treatment with potentially fewer aftereffects.

At Rush, the multidisciplinary genitourinary cancer team focuses on innovative approaches to diagnosis and treatment that aim to minimize residual effects and maximize patients' quality of life.

Urologist **Andrew Stephenson, MD, MBA**, says that precise diagnosis is key to formulating the right plan. "Prostate cancer in particular is often invisible on conventional imaging," he explains, so the team is using a breakthrough robot-assisted technology

If the treatment plan includes surgery, it is likely that the procedure will be minimally invasive. The genitourinary cancer team performs more robotic surgeries than any other service line at Rush. Urologists at Rush are recognized as global experts in the use of minimally invasive robotic surgical approaches to treat cancers of the prostate, bladder, kidney, testes and penis, achieving outcomes similar to conventional surgery with more rapid recovery and fewer side effects.

For patients whose cancers do not require immediate treatment, Rush urologists are also known for their expertise in novel diagnostic approaches and genomics to better characterize patients' cancers and improve outcomes of watchful waiting and active surveillance. /

Team approach plus high-tech tools

After diagnosis, the multidisciplinary genitourinary cancer team — which includes urologists; medical, surgical and radiation oncologists; researchers and pathologists — confers and creates a customized plan.

“We can handle the full spectrum of disease, from cutting-edge treatment for early-stage patients to novel investigational approaches for the most advanced patients.”

– Timothy M. Kuzel, MD, Chief,
Division of Hematology/Oncology/Cell Therapy

that's available in the United States only at Rush. Image-guided targeted transperineal biopsy uses MRI to detect and sample prostate cancers right in the physician's office — a minimally invasive procedure that's not only more accurate but also far more comfortable for patients.

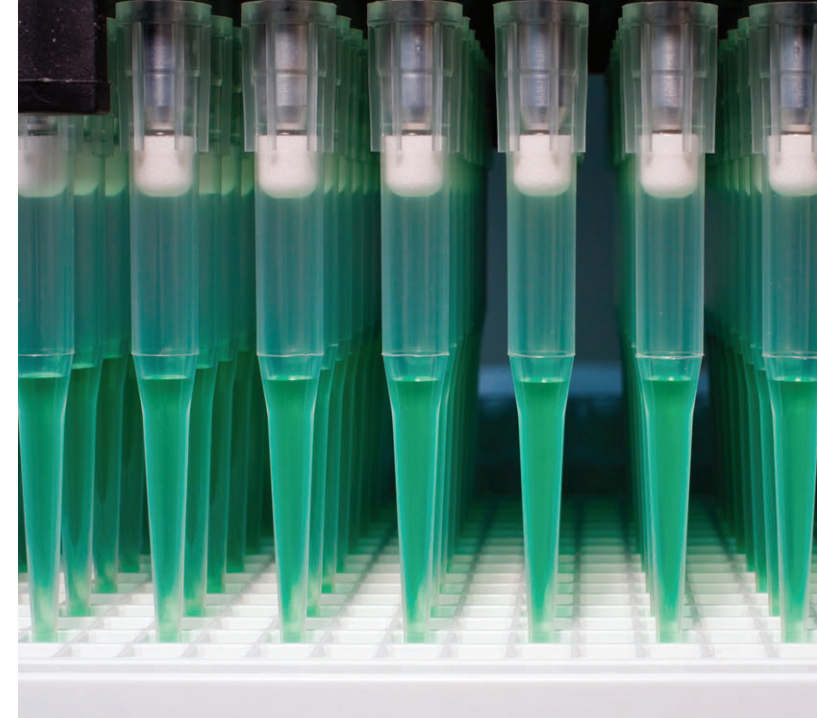
This technology will also enable in-office delivery of focal therapy, which uses thermal energy to destroy cancerous cells without harming non-cancerous areas. Focal therapy has the potential to achieve similar cancer control rates as surgery and radiation, with fewer aftereffects.

Rush is also using irreversible electroporation (IRE, available in North America only at Rush) for targeted treatment of prostate cancer. ■

Partnership brings leading-edge radiation oncology to Rush

Rush's partnership with Alliance Oncology ensures access to state-of-the-art radiation oncology treatments for genitourinary cancer patients and gives Rush clinicians access to huge national datasets of clinical benchmarks.

Radiation oncology treatment options available at Rush currently include IGRT, SBRT, IMRT, brachytherapy and Ra-223, and next-generation PET scans using the radiopharmaceutical Ga-68 dotatate will be available in 2020, according to radiation oncologist **Dian Wang, MD, PhD**.



Precision oncology for urologic cancers

Advances in precision oncology and immunotherapy have helped improve outcomes for people with genitourinary cancers. Rush's genomic testing partner, Tempus, can now identify genomic variants and suggest therapeutic options — including clinical trials for which Rush is the only Midwest location — for a patient's unique molecular and clinical profile. And thanks to combination targeted therapies or immunotherapies, survival rates for kidney cancer have risen from a year or less to five years or more.

“I tell patients that even when there's not a cure, we can turn your disease into a chronic disease like diabetes or high blood pressure that will need management throughout your life — but ultimately you'll die from something else before you die from your cancer,” Stephenson says.

Thanks to combination targeted therapies or immunotherapies, survival rates for kidney cancer have risen from a year or less to five years or more. /



Above: Lisa Stempel, MD

Information Is Power

Informing patients of their breast cancer risk and helping them build relationships with specialized providers saves lives.

Most people who are at high risk for breast cancer don't know it, says **Lisa Stempel, MD**, director of breast imaging at Rush. But Rush is changing the paradigm by offering personalized breast cancer screening that empowers patients to know their risk and connects them with the supplemental screening they need to allow for the early detection of breast cancer.

Every patient who comes to Rush for a mammogram now receives a tailored breast cancer risk assessment.

An intake questionnaire combines their data with history from the electronic health record and feeds it into a comprehensive risk assessment platform. This process helps determine each patient's lifetime risk for breast cancer, and allows for evidence-based recommendations for an ongoing plan of annual or semi-annual breast screening and follow-up care.

Patients whose lifetime risk of breast cancer is 20% or more are connected with the cancer risk assessment nurse navigator. The navigator guides them through the recommended next steps, which might include further screening with additional modalities such as MRI. And if the patient meets certain criteria, the navigator also facilitates referrals for genetic counseling and a visit with a high-risk practitioner to discuss chemoprevention with risk-reducing medications.

"It is proven that having a relationship with a navigator improves patients' follow-up with additional recommendations," says Stempel, who adds that building relationships by connecting high-risk patients with a breast specialist is another goal for the coming year. ■

"Our goal is to make it really easy and seamless for patients to be screened."

— Mia Levy, MD, PhD

High-tech screening tools for every level of risk

Rush offers some of the most sophisticated breast cancer screening technology in the region, including 2D contrast-enhanced mammography (CEM), 3D tomosynthesis, and screening breast ultrasound (automated breast ultrasound, or ABUS) for patients with dense breast tissue. Rush also offers fast breast MRI, which is a highly sensitive breast MRI that is done in less than 10 minutes.

ABUS delivers 3D images of the entire breast. "With ABUS, we've found a significant number of small invasive cancers at an early-stage, all node-negative, which are not visible on the mammogram due to dense breast tissue," says Stempel.

Rush has the largest ABUS program in the city and is one of the only centers in the Chicago area to offer contrast-enhanced digital mammography, a highly sensitive tool that's easily tolerated by patients. Those at higher risk have a range of options tailored to their needs, including these tools as well as breast MRI.

"Our goal is to make it really easy and seamless for patients to be screened," says **Mia Levy, MD, PhD**, director of the Rush University Cancer Center, "and to learn from every patient's experience so we can move continuously toward detecting breast cancer at earlier stages." /

Unmatched surgical expertise

Patients who need surgery for breast cancer are in expert hands at Rush.

Experienced surgeons use the latest technology and techniques to achieve the best possible outcomes, says breast surgeon **Rosalinda Alvarado, MD**.

For example, a lumpectomy for early-stage non-palpable breast cancer can be done using the SAVI Scout wire-free localization system, which uses advanced radar technology to help the surgeon locate and remove the tumor and surrounding tissue with pinpoint accuracy.

Patients who require or choose mastectomy often have a range of options such as skin-sparing and nipple-sparing mastectomy, which can assist in achieving natural-looking results. Rush also offers comprehensive reconstructive options, including implant-based reconstruction and sophisticated free-flap reconstruction procedures performed by a highly trained plastic surgeon. ■

Below: Anuja Antony, MD, MPH



A Message of Hope for Lung Cancer

Medical oncologist Philip Bonomi, MD, specializes in lung cancer and marks his 50th anniversary in medical practice in 2020. A recipient of the first Cancer Care Team Award from the International Association for the Study of Lung Cancer, Bonomi recently shared his thoughts on the evolution of lung cancer care — and how his message to patients has evolved along with it.



Philip Bonomi, MD

One of the things I learned early in medical school was never to forget that it's a privilege when a patient puts his or her trust in you. I have never taken that privilege lightly; my goals have always been to prolong meaningful life and relieve suffering for my patients. That's been my personal mission statement throughout my career.

However, those goals have not always been easy to achieve in treating lung cancer. When I started out in medicine, there weren't a lot of options for our patients; some of the treatments we tried for lung cancer were simply not effective, and often the prognosis was poor. But I've seen that believing in an idea and not giving up on it can pay off.

Immunotherapies are a case in point. When I was in medical school in the late 1960s, we had high hopes for immunotherapy and thought it was going to be very important for treating patients with cancer ... but we then saw one failed study after another over the next few decades.

However, some basic scientists and clinicians didn't give up on the idea. In recent years, their breakthroughs have led to significant improvements for using immunotherapies — and new hope for many patients with lung cancer.

“One of the things I learned early in medical school was never to forget that it's a privilege when a patient puts his or her trust in you.”

— Philip Bonomi, MD

Timeline to success

In 2015, immune checkpoint inhibitors were showing results as second-line therapy for advanced lung cancer that had progressed on chemotherapy — and they were more effective and had fewer side effects than the available chemo. One study of previously treated patients with no hope for long-term survival resulted in 15% of the patients surviving, with most not needing to be on active anti-cancer treatment. We needed more studies and more patients, but we started seeing the possibility of treating lung cancer as a chronic disease.

In 2016, a study showed that patients who had a protein in a PDL-1 tumor would live longer with immunotherapy alone as the initial therapy, vs. chemotherapy as the initial therapy. This study led to the FDA approval of pembrolizumab, a new immunotherapy drug for this group of patients.

The following year, we saw that giving the chemo drugs pemetrexed and carboplatin in combination with pembrolizumab resulted in a significantly higher response rate and delayed progression in patients with non-squamous lung cancer. After FDA approval, we started treating some of our patients at Rush with this combination and saw impressive response rates, and in 2018, these findings were validated in a larger study: For patients with stage IV, non-curable, non-squamous cell lung cancer, this combination reduces the risk of death by 50%.

A new message for patients

A question I frequently hear from my patients is, “If we can keep it under control, new treatments will come along, right?” Ten years ago, the chances of something new that would help were slim. But in the past few years, my message to patients has changed.

First, the message was, “We're going to try to keep you alive longer.” Then, “We're going to try to convert this to a chronic disease you can live with.” Now, I believe that some patients may be cured with these immunotherapies. Even if the cancer is not all gone, it may be under control. That's a huge shift, and it is amazing.

Lung cancer screening saves lives

Nearly 10 years ago, the National Lung Screening Trial (NLST) showed a 20% reduction in mortality when low-dose CT screening was used to screen people at high risk for lung cancer. Findings from this landmark study paved the way for lung cancer screening to be covered by insurance.

Rush fully implemented lung cancer screening in 2015. Our robust program carefully evaluates and screens patients at high risk for lung cancer. Rush uses a multidisciplinary approach which includes thoracic surgery, oncology and dedicated thoracic radiologists. Nurse coordinators navigate patients with concerning findings to the next level of care.

Rush's dedication to screening best practices is demonstrated by its patient outcomes. Since 2015, 43 lung cancers have been detected. Sixty percent were early stage disease; 80% of patients benefited from minimally invasive surgeries.

Lung cancer screening continues to evolve. In 2020, the *New England Journal of Medicine* published results from the NELSON trial, finding that screening provided a 24% reduction in lung cancer deaths. Findings from this study led to possible expansion of lung cancer screening guidelines announced by the United States Preventive Services Task Force in July 2020.

I didn't think the White Sox would ever win the World Series during my lifetime, and I never thought we'd be talking about people with late-stage lung cancer going into remission and staying there. Being able to help my patients live longer, more meaningful lives with less suffering is what drives me every day — and these new treatments and advancements have given me and my patients a lot of hope. ■



Growing Programs



Above: Angela Johnson, MSTOM, MPH, LAc, Dipl OM

Supportive Oncology

Supporting patients through the physical, emotional and psychosocial complexities of cancer care is the top priority for Rush's supportive oncology program.

This year, Rush welcomed **Teresa Deshields, PhD**, as the new director of the supportive oncology program. Since her arrival she has focused on developing synergy among the different services in the Cancer Center to make sure patients have the resources they need to get through their cancer treatment with the best possible quality of life.

The goal of supportive oncology is to prevent, treat or manage the symptoms of cancer, the side effects of treatment and the psychosocial, emotional and spiritual problems related to cancer. Several years ago, the Commission on Cancer (CoC) added an accreditation standard for all cancer centers to do distress screening and identify resources to respond to patients' distress.

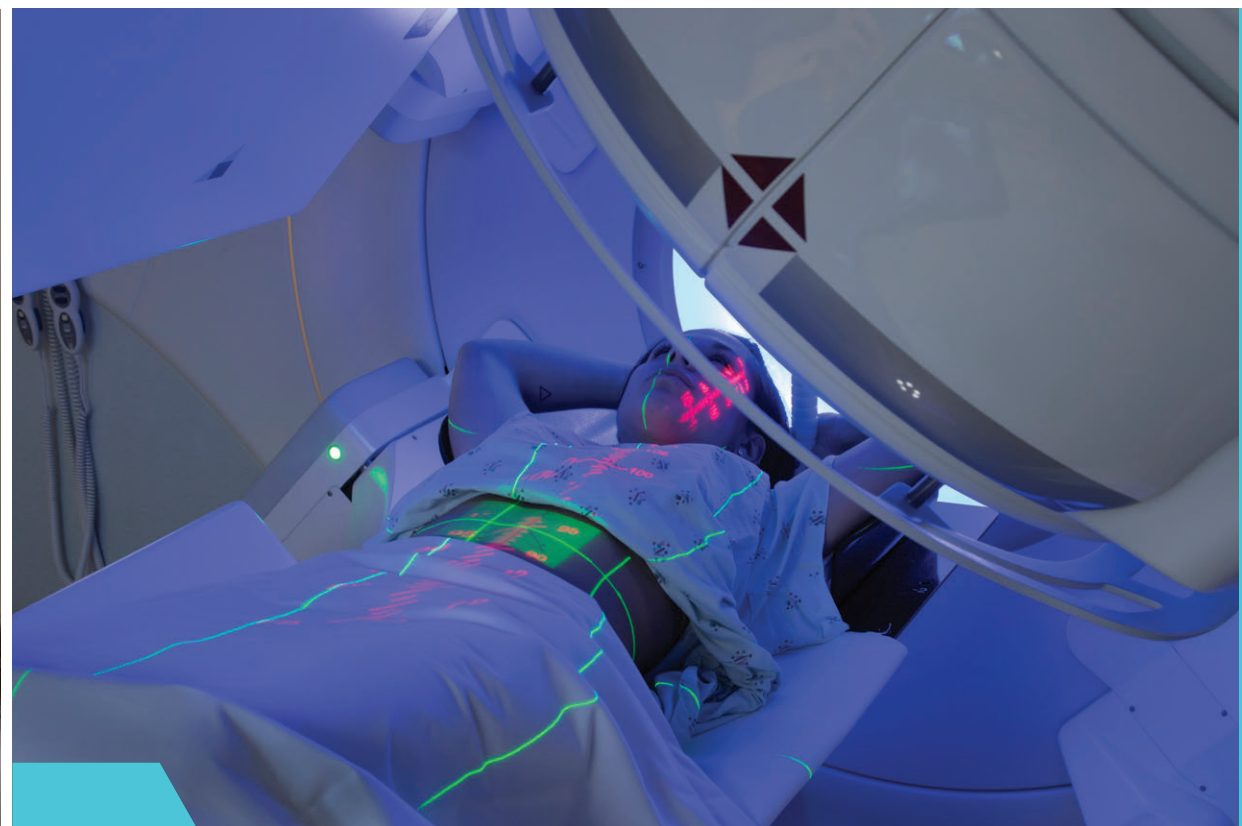
"Distress can come from a lot of different avenues for any particular patient," says Deshields. "Our role is to smooth out the things that make that harder for patients who have cancer and to help make sure they can get the excellent care that they need."

Deshields has focused on bringing more comprehensive and more immediate supportive oncology care to all cancer patients, with varying levels of needs. She and her team started by creating the supportive therapies active response (STAR) program. They put the processes and team in place to better address urgent needs, such as those who may be suicidal or in a crisis situation, as well as those who have less urgent — but still pressing — needs.

"There's often a gap in between patients who aren't at high risk but have some more pressing needs. It is not very effective to hand them a business card and say, 'Go home, call these people and you'll see them some other day, some other time, some other place.' That doesn't meet their level of need," says Deshields. "So we're trying to fill that gap with the STAR program by having a behavioral health provider available who can answer the pager immediately, come to the clinic, meet with that patient's care team, find out what is going on with the patient, meet with the patient, do a brief assessment, and perhaps do a brief intervention if that's indicated. That way we can do something right away to help the patient."

The supportive oncology team is also coordinating this continuum of care by helping patients make the appointments they need and doing a warm hand-off to the service or resource the patient needs.

"Cancer care is increasingly individually tailored, and there are so many different treatment options depending on the diagnosis, patients' biomarkers and so many other factors," says Deshields. "We want supportive care to be similarly tailored to each patient. We recognize that each patient has their own set of challenges through treatment. The more resources we can bring to bear, the more likely we'll be able to meet any particular patient's needs." ■



Radiation Oncology



Brett Cox, MD

Over 50% of cancer patients in the United States receive radiation therapy as part of their cancer treatment. "Radiation therapy is a precise, computer-driven, image-guided, ablative technology," says **Brett Cox, MD**, chairperson of radiation oncology at Rush. "If you're going to provide top-notch cancer care and have the best outcomes, the highest cure rates and the best functional quality of life for your patients, you need a strong radiation oncology program."

Rush has focused on building up its already impressive radiation oncology program, welcoming Cox as the new chair, recruiting talented faculty and investing in new technologies. Rush also continued to be one of the top clinical trial recruitment sites in the country for radiation oncology studies through NRG Oncology.

As part of comprehensive cancer treatment, the radiation therapy team helps successfully treat cancer while preserving patients' organs and quality of life. "One thing that radiation does really well is that we don't have disfiguring or poor functional outcomes as you have when removing a vital organ," says Cox. "For example, in the old days, they used to have to amputate if a patient had a sarcoma. Now, working with our orthopedic oncology colleagues, a patient's care plan can include a limb-preserving surgery plus the radiation. And this is often the case with many types of cancer, including bladder cancer, lung cancer, throat cancer, brain cancer and so on."

Each radiation oncologist at Rush specializes in specific tumor sites, making them experts in all radiation options, clinical trials and specialized procedures like brachytherapy, stereotactic radiosurgery (SRS) and systemic radiation treatments.

As tumor site specialists Rush radiation oncologists are part of every comprehensive cancer clinic and tumor board. "We have an indispensable modality that's been proven to save lives and improve patients' quality of life," says Cox. "By working as a team with surgeons, medical oncologists and others, we weigh all the options for our patients. We discuss best evidence-based treatments in a collaborative fashion — ultimately developing a care plan that is best for each patient." ■



Case Study

Successful TORS Treatment of Adenocarcinoma of the Oropharynx

When a rare head and neck tumor brought 81-year-old John Scambler, DDS, to Rush University Medical Center, the head and neck cancer team used transoral robotic surgery (TORS) to treat it successfully and return him to his full, active life.

History

Scambler, age 81, had been experiencing intermittent soreness and foreign-body sensation in his throat, as well as an earache. In 2015, his otolaryngologist treated a fungal infection in his left ear, but the earache remained. An orthodontist diagnosed possible temporomandibular joint disorder, but that treatment also failed to help. As the primary caregiver for his wife, who had Alzheimer’s disease, Scambler didn’t have much time to manage his own health. In 2017, Scambler’s ENT performed a throat biopsy and diagnosed adenocarcinoma of the oropharynx.

Assessment and plan

The ENT referred Scambler to Rush otolaryngologist/head and neck surgeon **Kerstin Stenson, MD**, who brought Scambler’s case to the multidisciplinary head and neck cancer team, which meets weekly and includes a radiation oncologist, a medical oncologist and a radiologist as well as other head and neck surgeons.

Samer Al-Khudari, MD, an otolaryngologist/head and neck surgeon who specializes in transoral robotic surgery (TORS), is part of the team; Scambler’s tumor, located deep at the base of the tongue, was the first of its kind that he had ever seen. “This tumor is so rare that the ideal treatments aren’t necessarily clear — but as a team, we did a lot of research to find out what we could offer Dr. Scambler,” he says.

“The goal was not just survival, but survival and function. We prioritize both of those equally in a patient who has newly diagnosed head and neck cancer.”

— Kerstin Stenson, MD
Director of the head and neck cancer program

As a retired dentist, Scambler knew head and neck anatomy well, so he was an especially informed participant in his care. “When we met with Dr. Scambler, we decided that we’d do TORS first to get a look at this unusual tumor, and then we could decide on further treatment after the surgery,” Al-Khudari says. “TORS is a functional approach to head and neck cancer. Sometimes, robotics help remove cancer; sometimes it’s just to find and visualize it. Every patient’s disease, location and surgery goal is different, so we want to make sure we cover all possible options.”

Al-Khudari performed Scambler’s TORS surgery. He used an endoscope with a 3D camera to visualize the tumor and was able to use the system’s robotic arms and surgical tools to grasp the tumor and remove it completely — plus a margin of surrounding tissue — through Scambler’s mouth, sparing him a mandibulotomy.

Al-Khudari also performed a neck dissection; subsequent examination of the lymph nodes revealed no cancerous cells. ■



Follow-up

After the surgery, Scambler and his care team met to talk about whether further treatment was needed. “The tumor was confined to the tongue,” Al-Khudari says, “and as a team, we considered chemo and radiation, but we weren’t convinced either one was needed.”

Instead, Al-Khudari decided to monitor Scambler closely for any signs of recurrence — an approach with which the patient was completely on board after seeing the experience of a friend who had radiation for throat cancer and required a feeding tube. “I was 81 at the time and thought it would be wiser to take the life that surgery alone would offer, rather than go into radiation and give up a year of my life,” he says.

Ten days post-surgery, Scambler was able to leave the hospital. He never needed a feeding tube, and his speech and swallowing were not permanently affected. “He’s an independent guy,” Al-Khudari says, “and one of my primary concerns was that he not lose that independence and function.”

Left: Samer Al-Khudari, MD

At his first follow-up visit two and a half weeks later, Scambler’s pain was well controlled and he was eating by mouth with no issues. Today, Scambler sees Al-Khudari quarterly at Rush Oak Brook; he remains cancer-free and has returned to his active life of gardening, hiking, handball and volunteering with support groups for caregivers of Alzheimer’s patients. “I’m doing great. I don’t know how the whole thing could have gone any better,” he says.

“Everyone I talked to at Rush was compassionate, competent, careful and caring — I’m just really impressed with the people at all levels. They knew exactly what to do. All along, everybody knew it was a difficult time for me and had my best interest at heart.” /

Tumor Site

Program Teams

Bone and Soft Tissue Sarcomas

Clinical Specialists

Adult medical oncologist: Marta Batus, MD

Adult surgical oncologists: Cristina O'Donoghue, MD, MPH; Sam Pappas, MD

Diagnostic radiologists: James Cameron, MD; John Meyer, DO; Anthony Zelazny, MD

General surgeon: Jonathan Myers, MD

Interventional radiologist: Bulent Arslan, MD; Davis Tabriz, MD; Jordan Tasse, MD

Adult medical oncologist: Marta Batus, MD

Orthopedic oncology surgeons: Alan Blank, MD, MS; Matthew Colman, MD; Steven Gitelis, MD

Pathologists: Ira Miller, MD; Vijaya Reddy, MD

Advanced practice provider, medical oncology: Maria Stone, FNP-BC

Advanced practice provider, orthopedics: Patti Piesecki, APRN

Pediatric and adult oncology nursing coordinator: Ann Bernardi, RN

Pediatric medical oncologists: Lisa Giordano, MD; Paul Kent, MD; Nupur Mittal, MD

Pediatric palliative medicine specialist: Rani Ganesan, MD

Pediatric physiatrist: Laura Deon, MD

Pediatric social worker: Erika Owens, MSW

Pediatric surgeon: Srikumar Pillai, MD

Plastic and reconstructive specialists: Amir Dorafshar, MD; Gordon Derman, MD; Deana Shenaq, MD

Radiation oncologist: Dian Wang, MD, PhD

Radiology: Gregory White, MD; John Ebersole, MD; Mike Ralls, MD

SARCOMA CONFERENCE
Wednesdays, 9 to 10 a.m. [Janet Wolter, MD, Clinical and Educational Conference Room, 1010 Professional Building](#)

Brain and Skull Base Tumors

Clinical Specialists

Medical oncologists (skull base tumors): Mary Jo Fidler, MD; Michael Jelinek, MD, John Showel, MD

Neuro-oncologist: Joo Yeon Nam, MD

Neuroradiologists: Sharon Byrd, MD; Miral Jhaveri, MD; Mehmet Kocak, MD

Neurosurgeons: Richard Byrne, MD; Lorenzo Muñoz, MD

Neurotologist: R. Mark Wiet, MD

Ophthalmologists: Adam Cohen, MD; Thomas Mizen, MD

Otolaryngologist/head and neck surgeons: Samer Al-Khudari, MD; Pete Batra, MD; Mihir Bhayani, MD; Elias Michaelides, MD; Pete Papagiannopoulos, MD; Kerstin Stenson, MD; Bobby Tajudeen, MD; R. Mark Wiet, MD

Pathologists: Paolo Gattuso, MD; Ritu Ghai, MD; Sukriti Nag, MD; Xinhai (Robert) Zhang, MD

Pediatric medical oncologists: Lisa Giordano, MD; Paul Kent, MD; Nupur Mittal, MD

Plastic and reconstructive surgeons: Amir Dorafshar, MD; Christina Tragos, MD

Radiation oncologist: Ken Tatebe, MD, PhD

Speech pathologists: Mike Hefferly, PhD; Michele Simer, MS; Joshua Teitcher, MS

Advanced practice provider, radiation oncology: Colleen Masters, NP

Advanced practice provider, neuro-oncology: Lisa Pierce, NP

BRAIN TUMOR CONFERENCE
Tuesdays, 11:30 a.m. to 12:30 p.m. [Janet Wolter, MD, Clinical and Educational Conference Room, 1010 Professional Building](#)

Breast Cancer

Clinical Specialists

Breast surgeons: Rosalina Alvarado, MD; Andrea Madrigano, MD; Cristina O'Donoghue, MD, MPH; Claudia Perez, DO

Diagnostic radiologists: Anne Cardwell, MD; Carol Corbridge, MD; Janice Dieschbourg, MD; Mireya Dondalski, MD; Brandie Fagin, MD; Paula Grabler, MD; Karen Hou, MD; Anita Nagamine, MD; Mariana Solari, MD; Gene Solmos, MD; Lisa Stempel, MD

Medical oncologists: Melody Cobleigh, MD; Ruta Rao, MD; April Swoboda, MD; Lydia Usha, MD

Pathologists: Paolo Gattuso, MD; Ritu Ghai, MD

Plastic and reconstructive specialists: Anuja Antony, MD, MPH; John Cook, MD; Amir Dorafshar, MD; Keith Hood, MD; Deana Shenaq, MD

Radiation oncologists: Brett Cox, MD; Thomas Kim, MD

Advanced practice providers, medical oncology: Sarah Anzevino, NP; Susan Budds, NP; Teri Dougherty, NP; Kaitlyn McGrail, PA-C

Advanced practice provider, breast surgery: Marcia Lovett, NP

BREAST TUMOR CONFERENCE
Mondays, noon to 1 p.m. [Janet Wolter, MD, Clinical and Educational Conference Room, 1010 Professional Building](#)

Endocrine and Thyroid Cancers

Clinical Specialists

Diagnostic radiologists: Amjad Ali, MD; Sumeet Virmani, MD

Endocrinologists: Brian Kim, MD; Elizabeth McAninch, MD

Medical oncologist: Mary Jo Fidler, MD; Michael Jelinek, MD

Otolaryngologists/head and neck surgeons: Samer Al-Khudari, MD; Kerstin Stenson, MD

Pathologists: Paolo Gattuso, MD; Ritu Ghai, MD; Ji-Weon Park, MD

Radiation oncologist: Nikhil Joshi, MD; Ken Tatebe, MD, PhD

ENDOCRINE TUMOR CONFERENCE
Second Wednesday of the month, 8 to 9 a.m. [Endocrine Clinic Suite, 250 Professional Building](#)

THYROID CANCER TUMOR CONFERENCE
Every fourth Wednesday, 8 to 9 a.m. [Janet Wolter, MD, Clinical and Educational Conference Room, 1010 Professional Building 28](#)

Gastrointestinal Cancers

Clinical Specialists

Colorectal surgeons: Anuradha Bhama, MD; Henry Govekar, MD; Dana Hayden, MD; Theodore Saclarides, MD

Gastroenterologists: Faraz Bishehsari, MD; Karen Ma, MD; Salina Lee, MD; John Losurdo, MD; Joshua Melson, MD, MPH

General surgeons: Daniel Deziel, MD; Keith Millikan, MD; Jonathan Myers, MD; Benjamin Veenstra, MD

Interventional radiologists: Bulent Arslan, MD; Sreekumar Madassery, MD; David Tabriz, MD; Jordan Tasse, MD; Ulku Cenk Turba, MD

Medical oncologists: Audrey Kam, MD; William Leslie, MD; Ashiq Masood, MD

Pathologists: Lin Cheng, MD; David Cimbalk, MD; Shriram Jakate, MD; Ira Miller, MD; Mark Pool, MD

Plastic and reconstructive surgeons: Amir Dorafshar, MD; Keith Hood, MD; Deana Shenaq, MD

Radiation oncologists: Thomas Kim, MD

Radiologists: Joy Sclamberg, MD; Gregory White, MD

Surgical oncologist: Sam Pappas, MD

Thoracic surgeons: Andrew Arndt, MD; Michael Liptay, MD; Christopher Seder, MD

Transplant hepatologists: Costica Aloman, MD; Sheila Eswaran, MD, MS; Sujit Janardhan, MD, PhD; Donald M. Jensen, MD; Nancy Reau, MD; Nikunj Shah, MD; Costica Aloman, MD; Sheila Eswaran, MD, MS; Sujit Janardhan, MD, PhD; Nancy Reau, MD; Nikunj Shah, MD

Transplant surgeons: Edie Chan, MD; Martin Hertl, MD, PhD; Erik Schadde, MD

Advanced practice provider, medical oncology: Anita Sharko, NP

Advanced practice providers, transplant hepatology: Colleen Folkers, ANP-BC; Wai Lam, MMS, PA-C; Sarah Repking, MSN, ACNP-BC; Vicki Shah, PA-C MMS

Advanced practice providers, transplant: Renee Evans, NP; Tanya Kidandi, AGPCNP-BC; Doug Krysan, MSPAS, PA-C

GASTROINTESTINAL TUMOR CONFERENCE
Tuesdays, 12:30 to 1:30 p.m. [Janet Wolter, MD, Clinical and Educational Conference Room, 1010 Professional Building](#)

Genitourinary Cancers

Clinical Specialists

Medical oncologists: Timothy M. Kuzel, MD; John Showel, MD; Alan Tan, MD

Plastic and reconstructive surgeons: Amir Dorafshar, MD; Keith Hood, MD; Deana Shenaq, MD

Radiation oncologist: Brett Cox, MD; Dian Wang, MD, PhD

Urologists: Edward Cherullo, MD; Christopher Coogan, MD; Shahid Ekbal, MD; Narendra Khare, MD; Andrew Stephenson, MD, MBA; Srinivas Vourganti, MD

Advanced practice provider, urology:
Katherine Marchese, NP

Advanced practice provider, medical oncology:
Kimberly Smallwood, NP

GENITOURINARY TUMOR CONFERENCE
Third Tuesday of the month, 7 to 8 a.m.
Janet Wolter, MD, Clinical and Educational
Conference Room, 1010 Professional Building

Gynecologic Cancers

Clinical Specialists

Gynecologic oncologists: Amina Ahmed, MD;
Summer Dewdney, MD; Andras Ladanyi, MD; Jean-
Marie Stephan, MD

Medical oncologist: Lydia Usha, MD

Pathologists: Pincas Bitterman, MD;
Ritu Ghai, MD; Lei Yah, MD

Radiation oncologist: Ken Tatebe, MD, PhD

Advanced practice providers:
Jennifer Castillo, PA-C; Theresa Nuestro, PA-C;
Sandra Obilade, NP; Margaret Wilson, PA-C

GYNECOLOGIC TUMOR CONFERENCE
Fridays, 7 to 8 a.m. Pathology Conference Room, 562
Jelke Building

Head and Neck Cancers

Clinical Specialists

Facial plastic and reconstructive surgeons:
Peter Revenaugh, MD; Ryan Smith, MD

Medical oncologists: Mary Jo Fidler, MD;
Michael Jelinek, MD, John Showel, MD

Neuroradiologists: Sumeet Dua, MD;
Miral Jhaveri, MD

Otolaryngologists/head and neck surgeons: Samer
Al-Khudari, MD; Mihir Bhayani, MD;
Pete Batra, MD; Pete Papagiannopoulos, MD;
Kerstin Stenson, MD; Bobby Tajudeen, MD

Pathologists: Paolo Gattuso, MD; Ritu Ghai, MD

Radiation oncologist: Nikhil Joshi, MD;
Ken Tatebe, MD, PhD

HEAD AND NECK TUMOR CONFERENCE
Wednesdays, 7 to 8 a.m. Janet Wolter, MD, Clinical
and Educational Conference Room, 1010 Professional
Building

Hematologic Cancers

Clinical Specialists

Dermatologist: Warren Piette, MD

Geneticist: Carolyn Jones, MD

Hematologist/oncologists: Lisa Boggio, MD;
Irene Dehghan-Paz, MD; Sefer Gezer, MD;
Shivi Jain, MD; Deborah Katz, MD;
Seo-Hyun Kim, MD; Melissa Larson, MD;
Agne Paner, MD; Jamile Shammo, MD;
Mindy Simpson, MD; Parameswaran Venugopal, MD

Palliative medicine specialists:
Jacqueline Cameron, MD; Elaine Chen, MD;
Jaime Lewis, MD; Sean O'Mahony, MB, BCH, BAO;
Mei-Ean Yeow, MB, BCH

Pathologists: Ira Miller, MD, PhD; Nicholas Ward, MD

Radiation oncologists: Gaurav Marwaha, MD;
Dian Wang, MD, PhD

Radiologist: Amjad Ali, MD

Stem cell transplantation specialists
M. Junaid Hussain, MD; Sunita Nathan, MD;
Celalettin Ustun, MD; Ankur Varma, MBBS;
Hyun Don Yun, MD

Advanced practice providers, hematology:
Kristin Gallas, PA-C; Jennifer Garson, PA-C;
Meghan Kelly, NP; Daina Mallard, PA-C;
Caitlin Murphy, DNP; Mary Schaefer, PA-C;
Sarah Swanson, NP

Advanced practice providers, stem cell transplant:
Jaqueline Baptista, NP; Katie Faletti, NP; Kristy Luke, NP;
Debra Marinovic, PA-C; Ashley Reimer, PA-C;
Kathryn Tinari, PA-C

HEMATOLOGIC CANCER CONFERENCES
Leukemia: Mondays, 1 to 2 p.m.
Lymphoma: Thursdays, 8 to 9 a.m.
Multiple myeloma: every other Friday, 8 to 9 a.m.
Myelodysplasia/myeloproliferative disorders:
every other Friday, 9 to 10 a.m.

Janet Wolter, MD, Clinical and Educational
Conference Room, 1010 Professional Building

Liver Cancer

Clinical Specialists

Diagnostic radiologist: Ryan Braun, MD

Interventional radiologists: Osman Ahmed, MD;
Bulent Arslan, MD; Jordan Tasse, MD;
Ulku Cenk Turba, MD

Medical oncologists: Audrey Kam, MD;
William Leslie, MD; Ashiq Masood, MD

Plastic and reconstructive surgeons:
Amir Dorafshar, MD; Keith Hood, MD;
Deana Shenaq, MD

Radiation oncologist: Thomas Kim, MD

Surgical oncologist: Sam Pappas, MD

Advanced practice provider, medical oncology:
Anita Sharko, NP

Transplant hepatologists: Costica Aloman, MD;
Sheila Eswaran, MD, MS; Sujit Janardhan, MD, PhD;
Donald M. Jensen, MD; Nancy Reau, MD;
Nikunj Shah, MD

Transplant surgeons: Edie Chan, MD;
Martin Hertl, MD, PhD; Erik Schadde, MD

Advanced practice provider, medical oncology:
Anita Sharko, NP

Advanced practice providers, transplant:
Renee Evans, NP; Tanya Kidandi, AGPCNP-BC;
Doug Krysan, MSPAS, PA-C

LIVER CANCER CONFERENCE
First and third Friday of the month,
7 to 8 a.m. 4th Floor, Tower, Suite 04413

Lung and Thoracic Cancers

Clinical Specialists

Diagnostic radiologist: Palmi Shah, MD

Interventional radiologists: Bulent Arslan, MD;
Jordan Tasse, MD; Ulku Cenk Turba, MD

Medical oncologists: Marta Batus, MD;
Philip Bonomi, MD; Mary Jo Fidler, MD

Palliative medicine specialist: Elaine Chen, MD

Pathologists: Paolo Gattuso, MD; Ritu Ghai, MD;
Mark Pool, MD

Plastic and reconstructive surgeons:
Amir Dorafshar, MD; Keith Hood, MD;
Deana Shenaq, MD

Pulmonary medicine specialists: Robert Balk,
MD; Elaine Chen, MD; James Katsis, MD; Prema
Nanavaty, MD; Abhaya Trivedi, MD; Mark Yoder, MD

Radiation oncologist: Gaurav Marwaha, MD

Thoracic surgeons: Gillian Alex, MD;
Andrew Arndt, MD; Nicole Geissen, DO;
Justin M. Karush, DO; Michael Liptay, MD;
Christopher Seder, MD

**Advanced practice providers, medical
oncology:** Irene Haapoja, NP; Nikki Patel, NP;
Maria Stone, NP

LUNG AND THORACIC TUMOR CONFERENCE
Thursdays, 10 to 11 a.m. Janet Wolter, MD,
Clinical and Educational Conference Room, 1010
Professional Building

Melanoma and Cutaneous Cancers

Clinical Specialists

Dermatologists: Mitchell Bressack, MD;
Kevin Cavanaugh, MD; Elizabeth Damstetter, MD;
James Ertle, MD; Claudia Hernandez, MD;
Faiyaz Kalimullah, MD; Marianne O'Donoghue, MD;
Warren Piette, MD;

Dermatopathologist: Vijaya Reddy, MD

Diagnostic radiologist: Joy Sclamberg, MD

Head and neck surgeons: Samer Al-Khudari, MD;
Kerstin Stenson, MD

Medical oncologist: Timothy M. Kuzel, MD;
Alan Tan, MD

Neurosurgeon: Lorenzo Muñoz, MD

Ophthalmologist: Adam Cohen, MD

Orthopedic oncologists: Alan Blank, MD, MS;
Matthew Colman, MD; Steven Gitelis, MD

Pathologist: Vijaya Reddy, MD

Plastic and reconstructive surgeons:
Anuja Antony, MD, MPH; Amir Dorafshar, MD;
Keith Hood, MD; Peter Revenaugh, MD;
Deana Shenaq, MD; Ryan Smith, MD

Radiation oncologist: Nikhil Joshi, MD;
Dian Wang, MD, PhD

Surgical oncologist: Cristina O'Donoghue, MD, MPH

Advanced practice provider, medical oncology:
Kim Smallwood, NP

MELANOMA AND SOFT TISSUE TUMOR CONFERENCE
Wednesdays, 11 a.m. to noon Janet Wolter, MD,
Clinical and Educational Conference Room, 1010
Professional Building

Pediatric Cancers

Clinical Specialists

Neuro-oncologists: Clement Pillainayagam, MD;
Joo Yeon Nam, MD

Orthopedic oncologists: Alan Blank, MD;
Matthew Colman, MD; Steven Gitelis, MD

Pediatric hematologist/oncologists:
Lisa Boggio, MD; Lisa Giordano, MD; Paul Kent, MD;
Nupur Mittal, MD; Mindy Simpson, MD

Pediatric neuroradiologists:
Sharon Byrd, MD; Mehmet Kocak, MD

Pediatric neurosurgeon: Lorenzo Muñoz, MD

Pediatric urologist: Jonathan Ross, MD

Plastic and reconstructive surgeons:
Amir Dorafshar, MD; Christina Tragos, MD

Radiation oncologist: Ken Tatebe, MD, PhD

Advanced practice provider, orthopedics:
Patti Piasecki, NP

Spine Tumors

Clinical Specialists

Neurosurgeons: Richard Fessler, MD, PhD;
Ricardo Fontes, MD, PhD; John O'Toole, MD, MS

Neuro-oncologists: Clement Pillainayagam, MD;
Joo Yeon Nam, MD

Orthopedic surgeons: Matthew Colman, MD;
Kern Singh, MD

Plastic and reconstructive surgeons:
Amir Dorafshar, MD; Keith Hood, MD;
Deana Shenaq, MD

Radiation oncologists: Brett Cox, MD;
Ken Tatebe, MD, PhD

SPINE TUMOR CONFERENCE
Thursdays, 9 a.m. to noon Woman's Board
Cancer Treatment Center, 500 S. Paulina St.

Palliative Care and Supportive Oncology

Clinical Specialists

Palliative medicine specialists:
Jacqueline Cameron, MD; Elaine Chen, MD;
Nelia Jain, MD; Ramandeep Kaur, MD; Neha
Kramer, MD;
Jaime Lewis, MD; Sean O'Mahony, MD, BCH,
BAO; Pringl Miller, MD; Mei-Ean Yeow, MB, BCH

Psychologists: Yasmin Asvat, PhD;
Teresa Deshields, PhD; Patricia Fank, PsyD;
Lauren Rynar, PhD

Psychiatrist: Jonathan Kaplan, MD

Social workers: Kimberly Morley, MSW;
Ashley Brouman, MSW

Chinese medicine practitioner:
Angela Johnson, Dipl, OM, MSTOM, MPH, Lac

Massage therapist: Michelle Haugen, Chaplain;
Dirk Labuschagne, MDiv, MPH

Dietitians: Monica Bojko, RD;
Hannah Manella, RD; Briana Kozak, RD

Psychology fellows: Ashley Perez, PsyD;
Ellen Kinner, PhD

Cancer Medical Specialists

Cardio-oncology: Tochukwu M (Tochi)
Okwuosa, DO

Precision oncology, medical oncologists:
Mia Levy, MD, PhD; Ashiq Masood, MD

Precision oncology, pharmacist:
Trevor Christ, PharmD, BCOP

Precision oncology, genetic counselor:
Karen Schmitz, MS, CGC

The Cancer Annual Report is produced by the Department of Marketing and Communications at Rush in collaboration with the Rush University Cancer Center. For more information, please contact us at diana_mirel@rush.edu.

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